

DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

U.S. MARINE CORPS
TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE
TECHNICAL ORDER

TM 5-2805-258-14

TM-03523B-14

TO 38G2-89-21

**OPERATOR, ORGANIZATIONAL, DIRECT
SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL**

**ENGINE, GASOLINE, 10 HP
MILITARY STANDARD MODELS
(MODEL 2A042-2) FSN 2805-952-3927
(MODEL 2A042-3) FSN 2805-872-5971**

This copy is a reprint which includes current
pages from Changes 1 and 2.

DEPARTMENTS OF THE ARMY, THE NAVY, AND THE AIR FORCE

JUNE 1969

SAFETY PRECAUTIONS

Before working on engine components, disconnect spark plug assembly to prevent accidental starting.

Because of the diversity of the equipment with which the military standard engine may be used, refer to the applicable and item technical manual for specific safety precautions.

CHANGE

No. 1

DEPARTMENTS OF THE ARMY,
THE NAVY

AND THE AIR FORCE

WASHINGTON, D.C. 9 June 1971

**Operator, Organizational, Direct Support and
General Support Maintenance Manual****ENGINE, GASOLINE, 10 HP MILITARY STANDARD MODELS****(MODEL 2A042-2) FSN 2805-952-3927****(MODEL 2A042-3) FSN 2805-872-5971**

TM 5-2805-258-14/TM 03523B-14/TO 38G2-89-21,
10 June 1969, is changed as follows:

Page 3. Paragraph 1-4, line 1 is changed to read:

Refer to TM 750-244-3, Destruction of Material
to Prevent Enemy Use.

Page 7. Paragraph 1-6, Table 1-1, Nut and Bolt
Torque Data,

delete line 2, "Drain plugs 12-13 ft.-lb. and
delete last line "Starter 16-18 ft. lb.

Page 40. Delete paragraph 4-5.

Page 41. Delete Table 4-3, Special Tools.

Page 56. Add paragraphs 5 and 6 as follows:

5. Shipment and Storage

TM 750-90-1 Administrative Storage of Equip-
ment

6. Demolition

TM 750-244-3 Demolition of Material to Prevent
Enemy Use

Page 58. Delete paragraph B-3.

Section II—MAINTENANCE ALLOCATION
CHART, in line with group no. 0105, under column
headed "(4) Tools and Equipment", delete "1, 2,
3,".

Page 59. Section II—MAINTENANCE ALLOCA-
TION CHART, in line with group no. 0603—Starter
Engine, delete the "F" in column "I" and "H" in
column "J".

Delete Section III—SPECIAL TOOL AND SPE-
CIAL TEST EQUIPMENT REQUIREMENTS.

By Order of the Secretaries of the Army, the Navy, and the Air Force:

W. C. WESTMORELAND,
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To be distributed in accordance with DA Form 12-25, Section I, (qty rqr block No. 90) Operator maintenance requirements for Engine, Gasoline, 10-20 HP MS.

Navy:

"MARCORPS LIST: 'AK' less 4058
plus 4068 (5)"

TM 5-2805-258-14
TM-03523B-14, C 2
TO 38G2-89-21
C 2

CHANGE

No. 2

DEPARTMENTS OF THE ARMY, THE NAVY,
AND THE AIR FORCE
WASHINGTON, DC, 16 June 1975

**Operator, Organizational, Direct Support
and General Support Maintenance Manual
ENGINE, GASOLINE, 10 HP MILITARY STANDARD MODELS
(MODEL 2AO42-2) NSN 2805-00-952-3927
(MODEL 2AO42-3) NSN 2805-00-872-5971**

TM 5-2805-258-14/TM-03523B-14/TO 38G2-89-21, 10 June 1969, is changed as follows:

The title is changed as shown above.

Page 3. Paragraph 1-2b is superseded as follows:

b. *Reporting of Errors.* You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals) located in the back of the manual and mail the form direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished direct to you.

Page 26, paragraph 3-29. Add the following subparagraphs:

e. Basic governor control rod length is 9-3/8 inches between mounting centers.

f. *Governor Adjustment when Using the Tillotson Carburetor.* Adjustment of the governor to carburetor control rod must be made with the rod connected to the Tillotson carburetor and disconnected from the governor arm. The control rod is then moved to full throttle. Starting with this condition, the length of the rod should be adjusted until the center line of the rod end ball joint aligns with the center line of the threaded hole in the governor arm. It may be necessary to readjust the rod length slightly ($\pm 1/8$ inch) for fine tuning.

g. *Governor Adjustment when Using the Bendix Carburetor.* Adjustment of the governor to carburetor control rod must be made with the rod disconnected from the governor arm and connected

to the Bendix carburetor. The control rod is then moved to the closed throttle position. Starting with this condition, the length of the rod should be adjusted to the point where there is approximately 1/2 inch between the hole in the governor arm and the hole in the ball joint. The governor rod is then connected by moving the rod and the throttle toward the full throttle position until the screw can be inserted in the governor arm. It may be necessary to readjust the rod length slightly ($\pm 1/8$ inch) for fine tuning.

Page 31, paragraph 3-33. The following Caution is added:

CAUTION

Disconnect end-item power supply prior to removal of electrical starter.

Page 36, figure 3-31. Delete note "2A042-3 is not equipped with breather reed."

Page 54. Paragraph 5-8 is superseded as follows:

5-8. Crankshaft and Main Bearings

a. Removal.

- (1) Remove camshaft (para 4-17).
- (2) Remove cylinders, pistons, and connecting rods (para 5-6).
- (3) Remove main bearing diaphragm assembly and crankshaft (figure 5-7).

b. *Disassembly.* Refer to figure 5-7 and disassemble crankshaft and diaphragm.

c. Cleaning, Inspection and Repair.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly. Insure that all oil passages in crankshaft are free of obstructions.

(2) Inspect crankshaft gear for excessive wear, pitting, cracks, breaks, or other damage.

(3) Inspect crankshaft for cracks, breaks, scoring main and crankarm bearing journals for out-of-round and/or excessive wear, run-out, evidence of overheating, damaged key and/or keyway, damaged threads or other damage.

(4) Inspect front main bearing diaphragm for cracks, breaks, wear or other damage.

(5) Inspect and measure the ID (inside diameter) of the front and rear main bearing bushings for excessive wear, scoring, evidence of overheating and for correct dimensions. Refer to table 4-2.

NOTE

If bushings are replaced they must be line bored to proper dimension after installation.

(6) Replace all defective parts.

d. **Reassembly.** Refer to figure 5-7 and reassemble crankshaft and front main bearing diaphragm assembly.

e. **Installation.**

(1) Install crankshaft assembly in crankcase and measure end play. Refer to table 4-2 for proper clearance. Torque diaphragm bolts to 3.4 to 4.7 ft. lbs.

(2) Install cylinders, pistons and connecting rods (para 5-6).

(3) Install camshaft (para 4-17).

to the Bendix carburetor. The control rod is then moved to the closed throttle position. Starting with this condition, the length of the rod should be adjusted to the point where there is approximately 1/2 inch between the hole in the governor arm and the hole in the ball joint. The governor rod is then connected by moving the rod and the throttle toward the full throttle position until the screw can be inserted in the governor arm. It may be necessary to readjust the rod length slightly (to 1/2 inch) for fine tuning.

Page 31, paragraph 5-23. The following Caution is added:

CAUTION

Disconnect engine power supply prior to removal of electrical system.
Page 36, figure 5-21. Delete note "5A042-3 is not equipped with breather rod."
Page 34, Paragraph 5-8 is superseded as follows:

5-8. Crankshaft and Main Bearings

a. Removal

- (1) Remove camshaft (para 4-17).
- (2) Remove cylinders, pistons, and connecting rods (para 5-6).
- (3) Remove main bearing diaphragm assembly and crankshaft (figure 5-7).
- b. Disassembly. Refer to figures 5-7 and disassemble crankshaft and diaphragm.
- c. Cleaning, Inspection and Repair.
 - (i) Clean all parts with an approved cleaning solvent and dry thoroughly. Insure that all oil passages in crankshaft are free of obstructions.

TM 5-2305-258-147M-00000-1470 2003-28-21, 10
June 1983 is changed as follows:
The title is changed as shown above.

Page 1, Paragraph 1-5 is superseded as follows:
A Reporting of Errors. You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Report of Errors to Publications).
needed changes to Equipment Technical Manuals) located in the back of the manual and mail the form direct to Commander, US Army Troop Support Command, ATTN: AMST-MPT, 4300 Goodfellow Road, St. Louis, MO 63120. A reply will be furnished based on your request.

Page 30, paragraph 5-23. Add the following sub-paragraph:
c. Basic governor control rod length is 0.92 inches between mounting centers.

1. Governor Adjustment when Using the Throttle Control. Adjustment of the governor to carburetor control rod must be made with the rod disconnected from the throttle carburetor and disconnected from the governor arm. The control rod is then moved to full throttle. Starting with this condition, the length of the rod should be adjusted until the center line of the rod and ball joint align with the center line of the threaded hole in the governor arm. It may be necessary to readjust the rod length slightly (to 1/2 inch) for fine tuning.

2. Governor Adjustment when Using the Bendix Carburetor. Adjustment of the governor to carburetor control rod must be made with the rod disconnected from the governor arm and connected



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FT. LEONARD WOOD MO 63108

DATE 16 DEC 74

PUBLICATION NUMBER

TM5-6115-200-20 AND P

DATE

1 APR 72

TITLE

GENERATOR SET 10 KW
NSN 6115-00-231-7286

BE EXACT... PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
81		4-3	
125	line 20		

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN.

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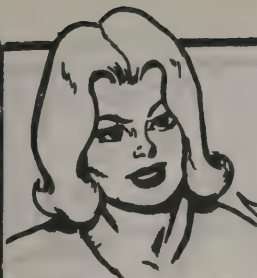
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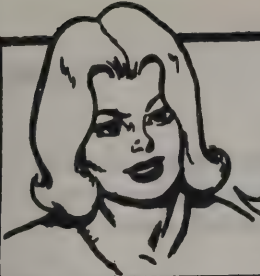
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To be distributed in accordance with DA Form 12-25A (qty rqr block No. 141), Operator maintenance requirements for Engines Gasoline, 10 HP Mil Std.

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2. [Illegible]

3. [Illegible]

4. [Illegible]

5. [Illegible]

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10. [Illegible]

11. [Illegible]

12. [Illegible]

13. [Illegible]

14. [Illegible]

15. [Illegible]

TECHNICAL MANUAL
No. 5-2805-258-14
MARINE CORPS MANUAL
No. 03523B-14
TECHNICAL ORDER
No. 38G2-89-21

DEPARTMENTS OF THE ARMY,
THE NAVY, AND THE AIR FORCE

WASHINGTON, D.C., 10 June 1969

**OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
ENGINE, GASOLINE, 10 HP MILITARY STANDARD MODELS
(MODEL 2A042-2), FSN 2805-952-3927
(MODEL 2A042-3), FSN 2805-872-5971**

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*This manual supersedes that portion of TM 5-2805-204-14, 26 July 1965, which pertains to Engine Models 2A042-II and 2A042-III.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are published for the use of the personnel maintaining the Military Standard Engines, Models 2A042-2 and 2A042-3 as allocated by the Maintenance Allocation Chart. It provides information on operator, organizational, direct support, and general support maintenance of the equipment, its accessories, and auxiliaries. The organizational, direct and general support maintenance repair parts and special tool lists are in TM 5-2805-258-24P.

b. Numbers in parentheses on illustrations indicate the quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

1-2. Forms and Records

a. DA Forms and records used for equipment

maintenance will be only those prescribed in TM 38-750.

b. Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to the Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo., 63120.

1-3. Administrative Storage

Refer to TM 740-90-1, administrative storage of equipment.

1-4. Destruction of Materiel to Prevent Enemy Use

Refer to applicable end item technical manual.

Section II. DESCRIPTION AND DATA

1-5. Description

The Military Standard Engines, Models 2A042-2 and 2A042-3 (fig. 1-1) are designed for general purpose use in industrial types applications. The two models are basically similar in design and concept. They are two-cylinder engines capable of delivering 10 net continuous horsepower at 3,600 rpm (revolutions per minute). They are equipped with a 10 amp (ampere), 24-volt, ac alternator, regulating type rectifier, and 24-volt dc starter with an electrically-operated solenoid. The carburetor is a side-draft with an automatic choke. Both are 4-cycle, horizontally-opposed, valve-in-head gasoline engines capable of satisfactory performance in all types of environments. They are designed to operate a minimum of 1,500 hours at rated load and speed before major overhaul. The electrical components of the engines are radio interference suppressed. All accessories of the en-

gines are located so as to provide maximum accessibility.

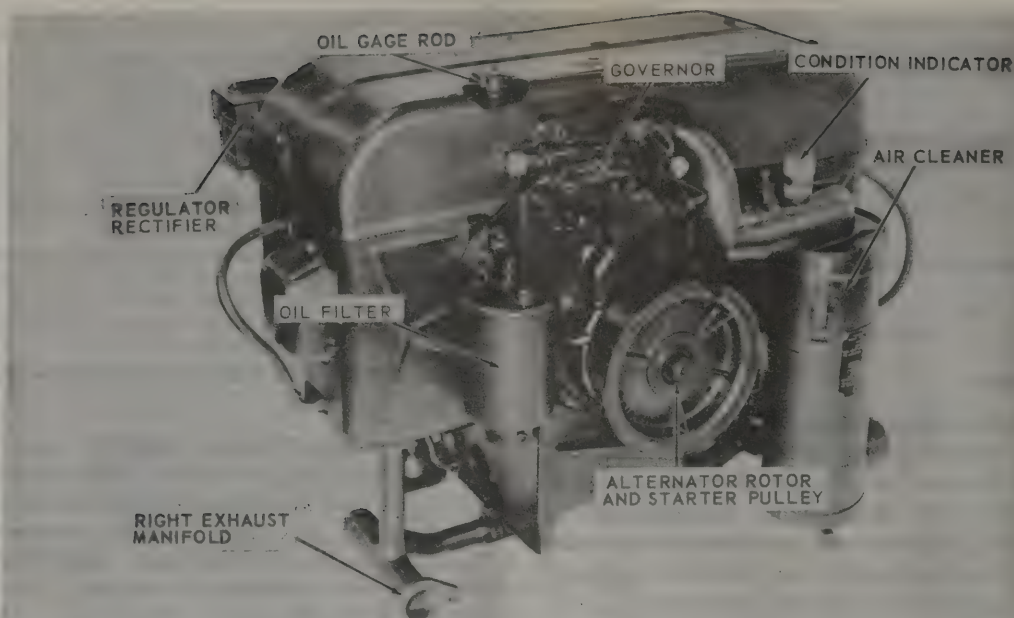
1-6. Identification and Tabulated Data

a. *Identification.* Each engine is provided with one identification plate, located on the upper side of the flywheel housing. It contains information on the manufacturer, model, nomenclature, Federal stock number, and displacement.

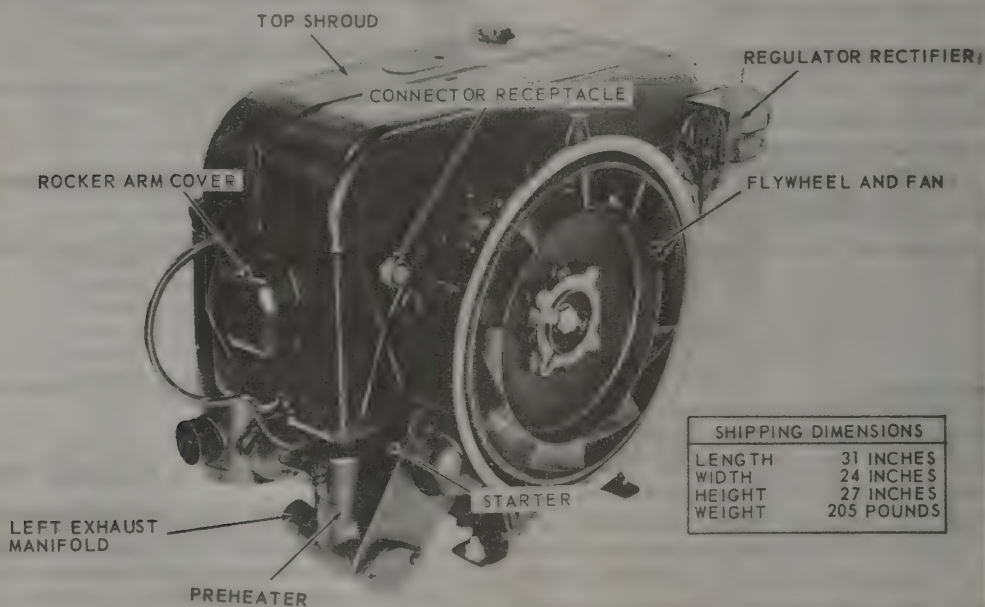
b. *Tabulated Data*

(1) *Engine*

Manufacturer	Military Standard
Model	2A042-2 and 2A042-3
Number of cylinders	2
Ignition	Magneto
Firing Order	1-2
Speed Range	2,000-4,000 rpm
Governed Speed	3,600 rpm
Rated Horsepower	10 at 3,600 rpm
Maximum Horsepower	17.5 at 3,600 rpm



A. RIGHT FRONT THREE-QUARTER VIEW



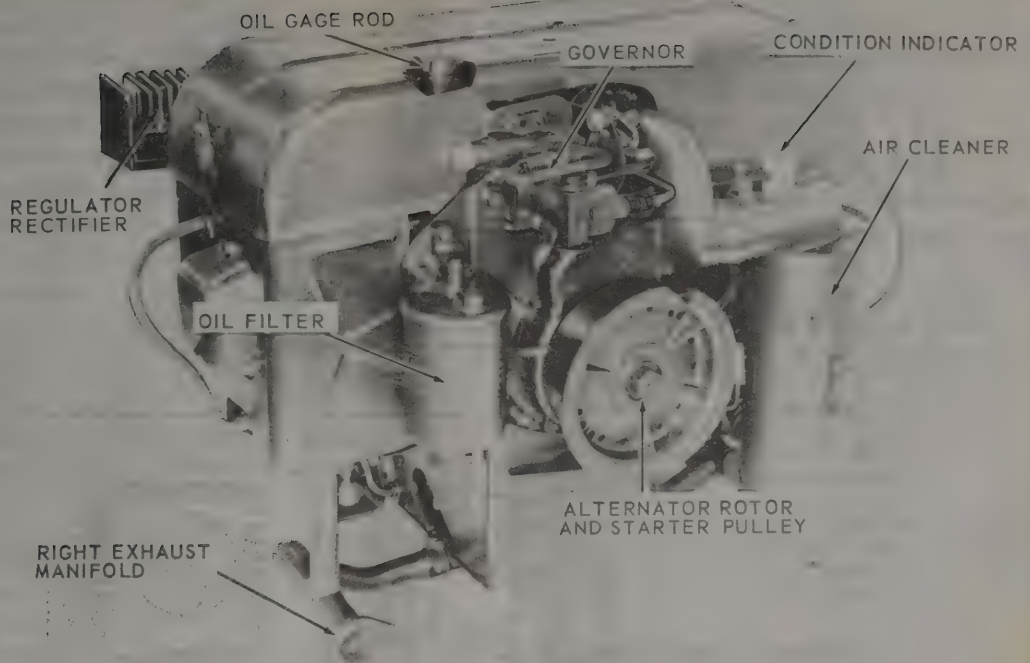
SHIPPING DIMENSIONS	
LENGTH	31 INCHES
WIDTH	24 INCHES
HEIGHT	27 INCHES
WEIGHT	205 POUNDS

B. LEFT REAR THREE-QUARTER VIEW

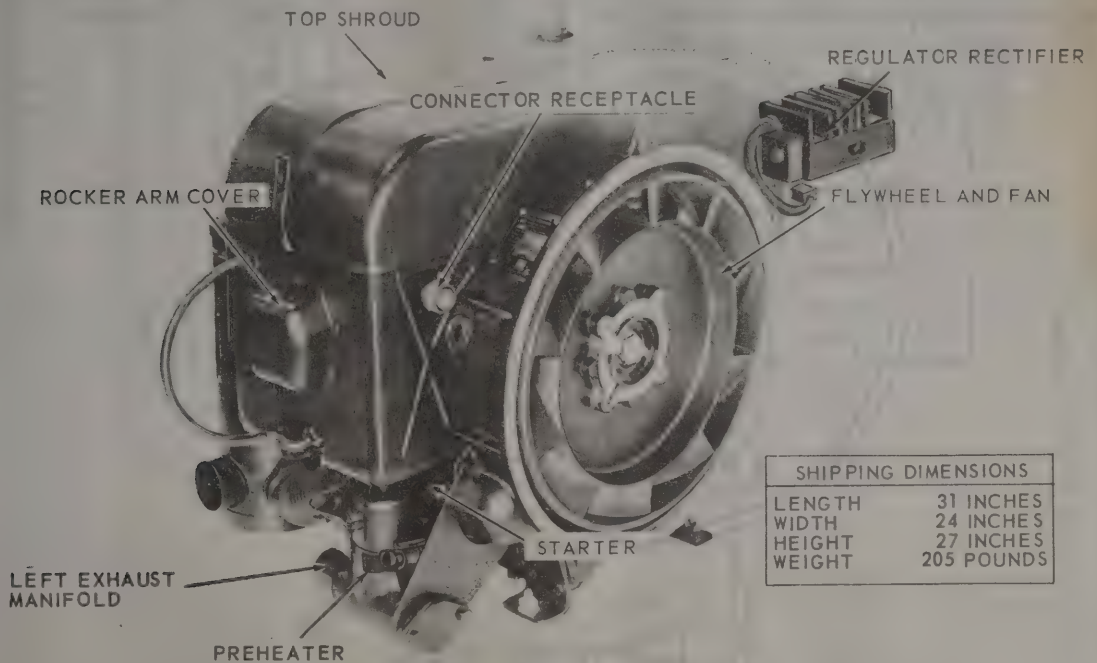
MEC 2805-204-14/1

1 Model 2A042-2

Figure 1-1. Engine with shipping dimensions.



A. RIGHT FRONT THREE-QUARTER VIEW



SHIPPING DIMENSIONS	
LENGTH	31 INCHES
WIDTH	24 INCHES
HEIGHT	27 INCHES
WEIGHT	205 POUNDS

B. LEFT REAR THREE-QUARTER VIEW

ME 2805-258-14/1-1 (2)

2 Model 2A042-3

Figure 1-1—Continued.

NOTE:
BATTERY FURNISHED WITH APPLICABLE
END ITEM.

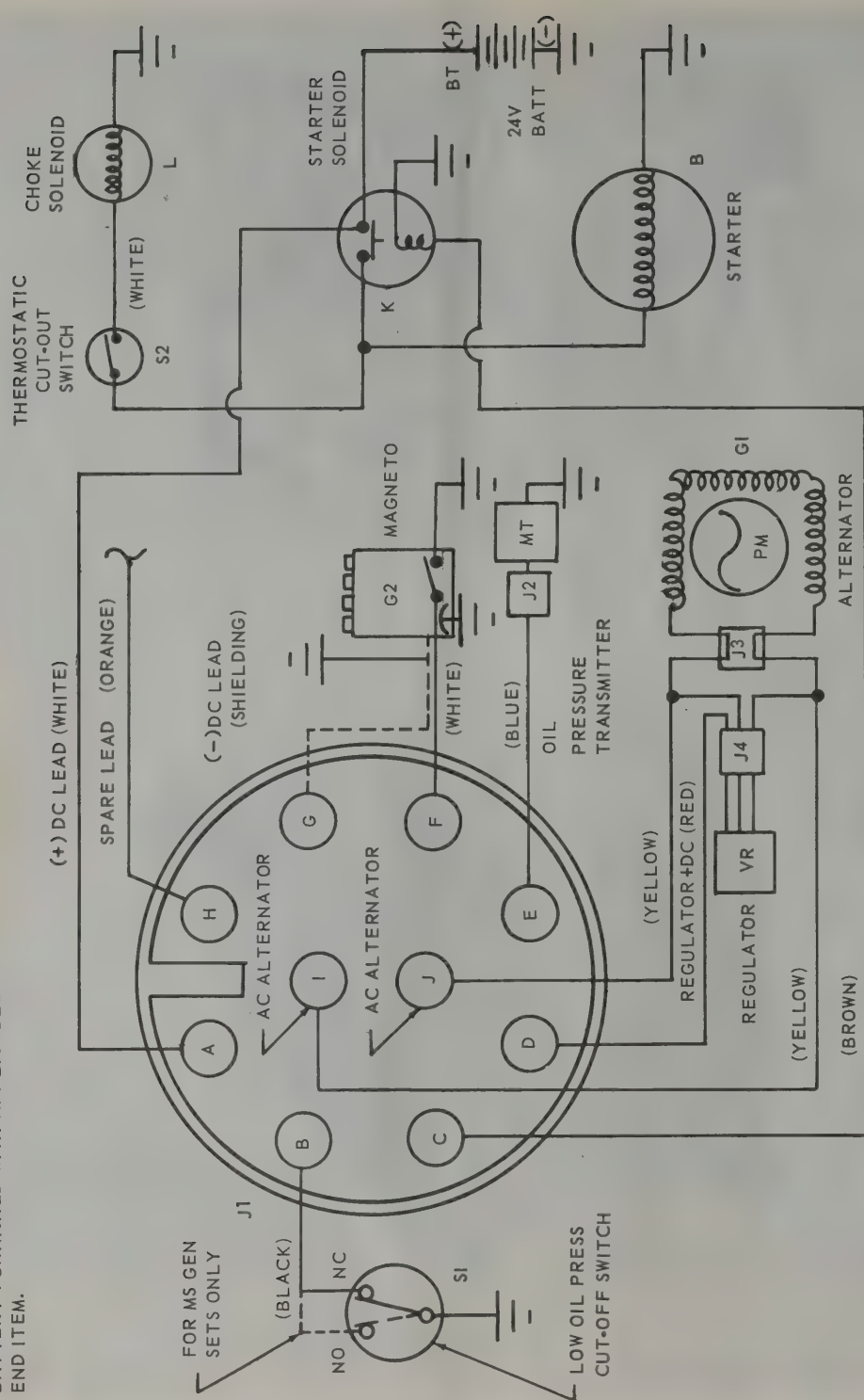


Figure 1-2. Wiring diagram.

(2) *Air Cleaner*

Type ----- Dry
MERDC Drawing No. ----- 13206E1250
MERDC Drawing No. ----- 13206E1253

(3) *Fuel Pump*

MERDC Drawing No. ----- 13214E8198

(4) *Carburetor*

MERDC Drawing No. ----- 13206E1170-1

(5) *Fuel Filter*

Government Part No. ----- MS51086-1

(6) *Governor*

Type ----- Centrifugal-Flyweight, type I
Model ----- MS35898 (Modified)
MERDC Drawing No. ----- 13214E8209

(7) *Alternator*

Manufacturer ----- R. E. Phelon Co.
MERDC Drawing No. ----- 13206E0707 (Stator)
----- 13206E0981 (Pulley)
Volts ----- 40 ac

(8) *Regulator-Rectifier*

MERDC Drawing No. ----- 13206E0813

(9) *Starter*

Government Part No. ----- MS53013-1
Volts ----- 24 dc

(10) *Magneto*

MERDC Drawing No. ----- 13215E1716

(11) *Capacities*

Crankcase ----- 2 qt (quart)
Oil Filter ----- $\frac{1}{2}$ qt

(12) *Adjustments*

Contact Points ----- 0.015
Spark Plugs ----- 0.028-0.033

(13) *Dimensions and Weight (Crated)*

Length ----- 31 in. (inches)
Width ----- 24 in.
Height ----- 27 in.
Weight (dry) ----- 205 lb (pounds)

(14) *Wiring Diagram*. Refer to figure 1-2.

(15) *Nut and Bolt Torque Data*. Refer to Table 1-1.

Table 1-1. *Nut and Bolt Torque Data*

Alternator to cover	1-2 ft-lb (foot pounds)
Drain plugs	12-13 ft-lb
Engine mount	10-12 ft-lb
Exhaust manifold	3-5 ft-lb
Fuel pump to case	4-5 ft-lb
Governor to case	4-5 ft-lb
Intake manifold	3-5 ft-lb
Magneto to case	10-12 ft-lb
Oil filter cap	6-7 ft-lb
Spark plug	23-25 ft-lb
Starter	16-18 ft-lb

1-7. *Differences in Models*

This manual covers only the Military Standard Models 2A042-2 and 2A042-3 gasoline engines only. The differences between the models is explained in the appropriate maintenance sections of the manual. There are no known unit differences within the individual models covered.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Inspecting and Servicing Equipment

a. Inspection.

(1) Inspect the identification plates for positive identification of the equipment.

(2) Make a thorough inspection of the entire engine for damage which may have occurred during shipment.

(3) Check the equipment against the packing list to make certain all items are accounted for and in serviceable condition.

(4) Inspect the components for loose or missing mounting hardware and loose connections.

b. Servicing.

(1) Lubricate the engine in accordance with lubrication order LO 5-2805-258-12.

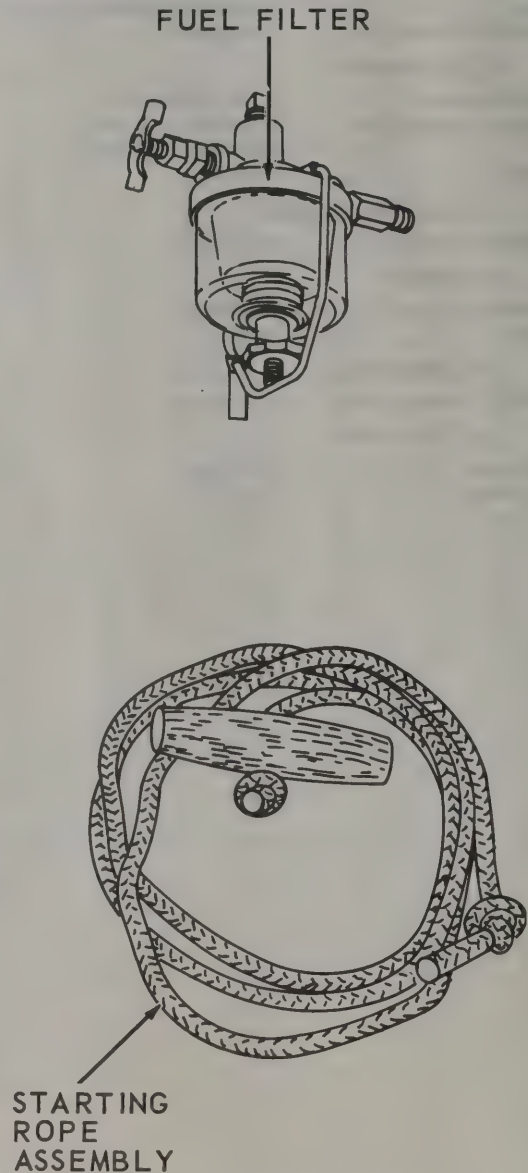
(2) Turn the engine with the starter rope to make sure all moving parts are free.

(3) Correct all deficiencies or report them to direct support maintenance.

2-2. Installation of Separately Packed Components

a. Fuel Filter. The fuel filter (fig. 2-1) is provided for the purpose of filtering the fuel before it enters the engine fuel pump. The location of the fuel filter is determined by the engine application on the end item. Consequently, no fittings or connecting fuel lines are furnished with the fuel filter.

b. Starting Rope Assembly. The starting rope assembly (fig. 2-1) is furnished for the purpose of manually cranking the engine. The starting rope must be kept with the engine at all times. The fuel filter and starting rope assembly are packed separately in a protective bag and attached to the engine.



MEC 2805-204-14/4

Figure 2-1. Separately packed components.

Section II. CONTROLS AND INSTRUMENTS

2-3. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the engine.

2-4. Controls and Instruments

Refer to figure 2-2 for the location, purpose and normal settings of all controls.

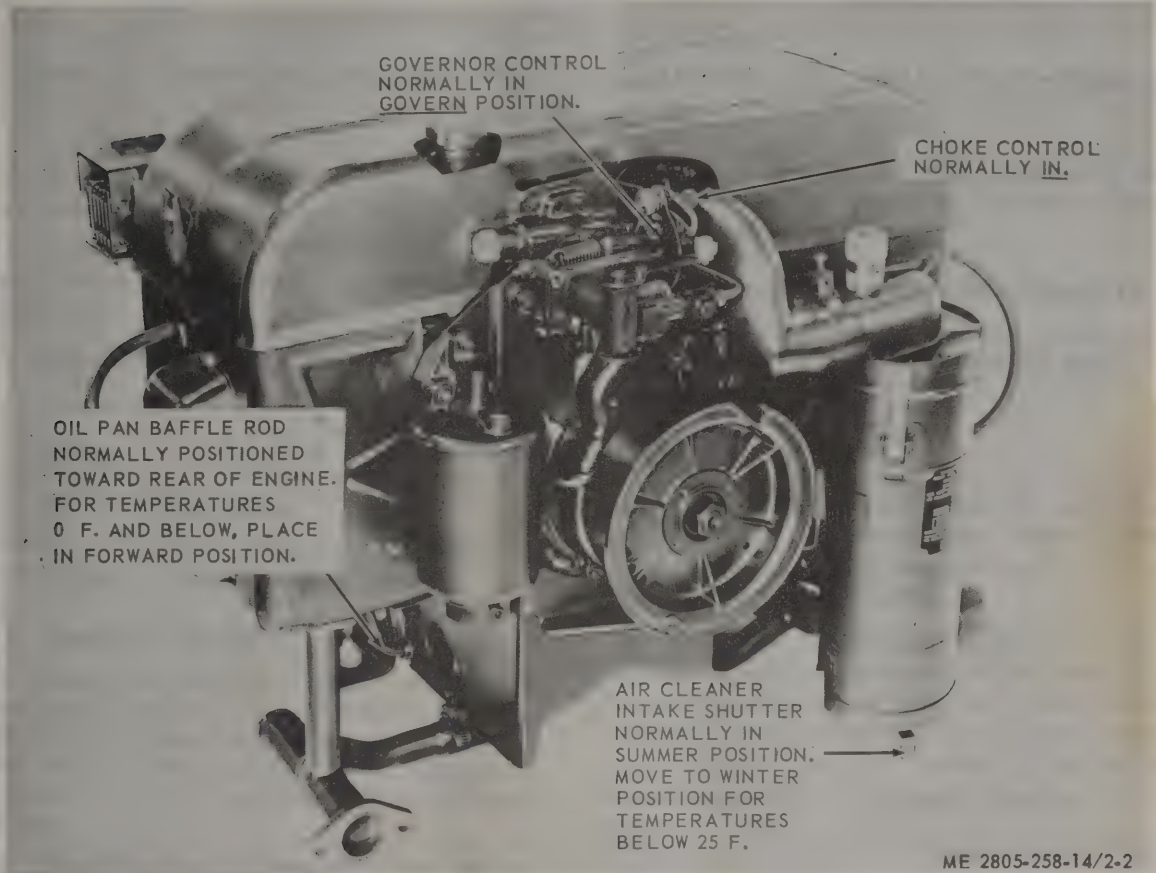


Figure 2-2. Engine controls.

Section III. OPERATION OF EQUIPMENT

2-5. General

a. Because of the diversity of equipment with which the Military Standard Engine may be used, not all operating instructions are provided in this manual. For specific operating instructions, refer to applicable End Item Technical Manual.

b. Prior to applying the applicable load requirement, allow engine to warm up at idle RPM (revolutions per minute) for 15 minutes. During opera-

tion in extreme cold temperatures (below 0° F., allow engine to warm up until it will maintain normal operation without aid of manual choke.

c. After removing load, allow engine to run at idle RPM for at least 15 minutes before shutting down.

Caution: Do not install or operate in a location where free flow of air to engine is obstructed. Do not remove engine cooling shrouds while operating engine under any conditions.

2-6. Operating Fuels

a. Temperatures Above 0° F. Grade 91A automotive gasoline (FSN 9130-160-1817) is required for operating engine in temperatures above 0° F.

b. Temperatures Consistently Below 32° F. Grade 91C automotive gasoline : (FSN 9130-160-8131) is required for operating engine in temperatures consistently below 32° F.

CHAPTER 3

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS, TOOLS AND EQUIPMENT

3-1. Tools and Equipment

a. Basic issue tools and repair parts issued with or authorized for the engine are listed in the Basic Issue Items List of applicable end item technical manual.

b. No special tools or equipment are required by

the operator or organizational maintenance personnel for the maintenance of the military standard engines.

3-2. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-2805-258-24P.

Section II. LUBRICATION

3-3. General Lubrication

Refer to current Lubrication Order LO 5-2805-258-12 for general lubrication.

3-4. Detailed Lubrication

a. *Care of Lubrication.* Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

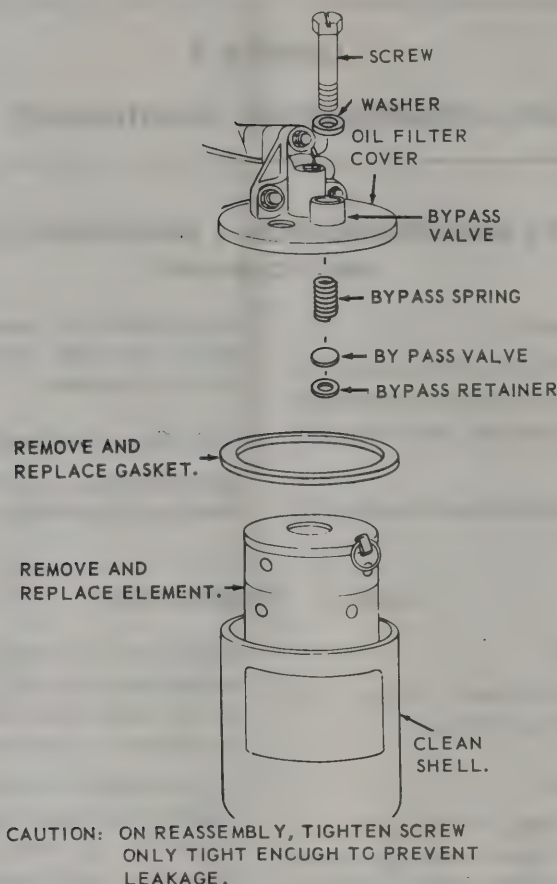
b. *Cleaning.* Keep all external parts not requiring lubrication free from lubricants. Before

lubricating the equipment, wipe all lubrication points free of oil, dirt, and grease. Clean all lubrication points after lubricating to prevent the accumulation of foreign matter.

c. *Operation Immediately After Lubrication.* Operate the engine immediately after lubrication. Inspect the oil filter, oil lines, and other connections which might cause oil leakage. If the crankcase oil has been changed, operate the engine for approximately 5 minutes before checking the oil level.

d. *Oil Filter.* Refer to figure 3-1 and service the oil filter.

NOTE:
CHECK BYPASS FOR OBSTRUCTIONS
OF MISSING PARTS.



ME 2805-258-14/3-1

Figure 3-1. Oil filter service.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

To insure that the Military Standard Engine is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

3-6. Preventive Maintenance Checks and Services

a. Table 3-1 contains a tabulated list of preventive maintenance checks and services which must be performed by the operator and organizational maintenance personnel.

b. The interval column designates the maintenance level and required service interval. A quarterly interval is equal to 3 calendar months or 250 hours of operation, whichever occurs first.

c. Refer to table 3-1 for the preventive maintenance checks and services.

Table 3-1. Preventive Maintenance Checks and Services

Item Num- ber	Interval							B—Before operation D—During operation	A—After operation W—Weekly	M—Monthly Q—Quarterly
	Operator				Org.					
	Daily				M	Q	Item to be inspected	Procedure	Reference	
	B	D	A	W						
1	X	X	X	---	---	---	Engine-----	Inspect the engine for loose or missing wiring, parts and for any oil or fuel leaks.	*Clean.	
2	X	---	X	---	---	---	Oil level gage-----	Check oil level, add if necessary. Refer to L.O. for correct grade of lubricant.		
3	X	---	X	X*	---	---	Fuel filter -----	Inspect fuel filter for dirt, water or sediment -----		
4	---	X	X	---	---	---	Oil filter-----	Inspect for oil leaks, repair if needed. Replace filter in accordance with current L.O.		
5	---	---	---	---	---	X	Spark plugs-----	Check for proper gap, dirty or defective plugs. Clean or replace as required.		
6	---	---	---	---	---	X	Air breather-----	Inspect for obstructions and clean if necessary.		
7	---	---	---	---	---	X	Governor-----	Check for proper adjustment. Adjust if necessary.		
8	---	---	---	---	---	X	Magneto-----	Inspect for worn or pitted contacts. Replace or adjust as required (500 hrs). Lube cam wick in accordance with current L.O.		

Section IV. OPERATOR'S MAINTENANCE

3-7. Air Cleaner Service

Refer to figure 3-2 and service air cleaner.

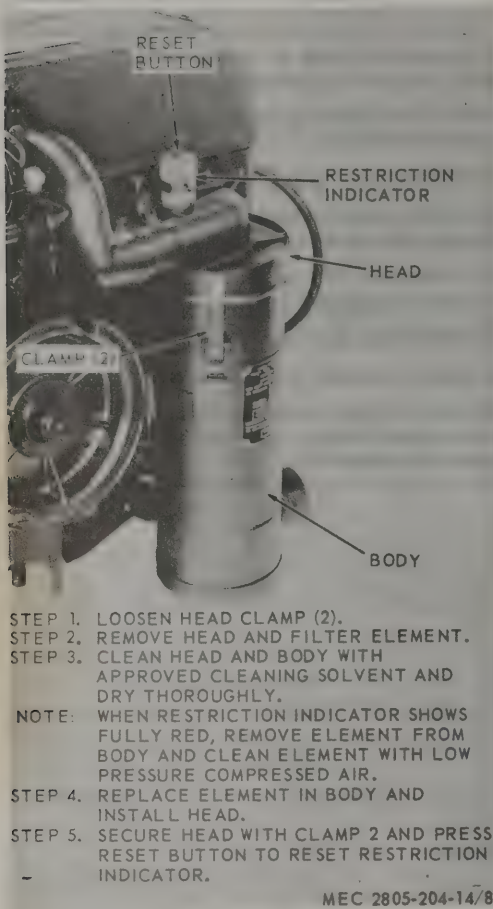
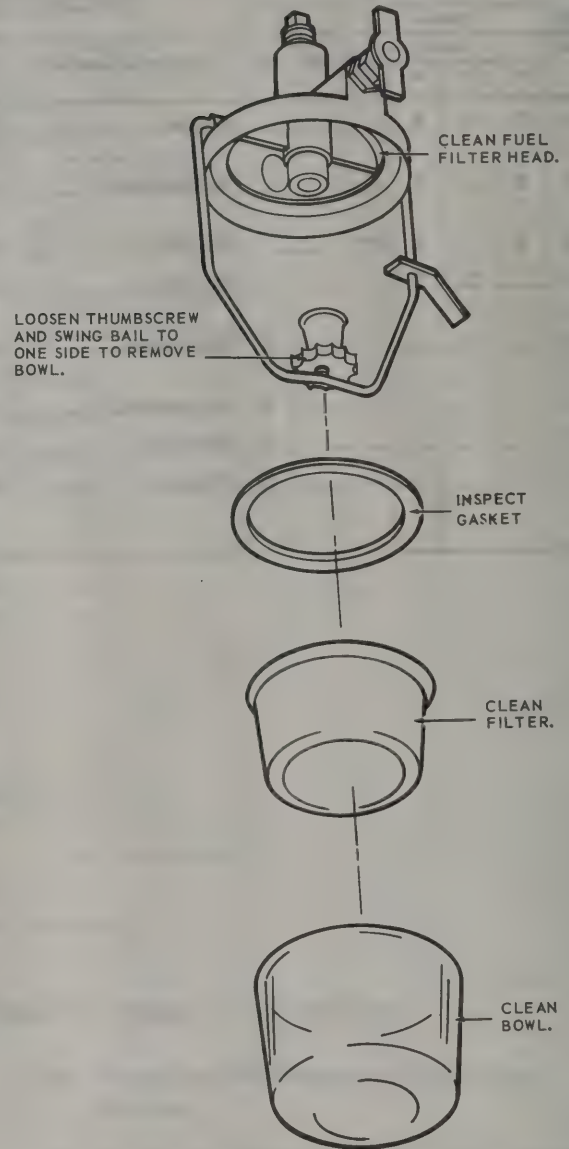


Figure 3-2. Air cleaner service.

3-8. Fuel Filter Service

Refer to figure 3-3 and service fuel filter.



ME 2805-258-14/3-3

Figure 3-3. Fuel filter service.

3-9. Fuses

a. Removal. Refer to figure 3-4 and remove fuses.

b. Cleaning and Inspection.

(1) Clean fuse with a clean, dry cloth.

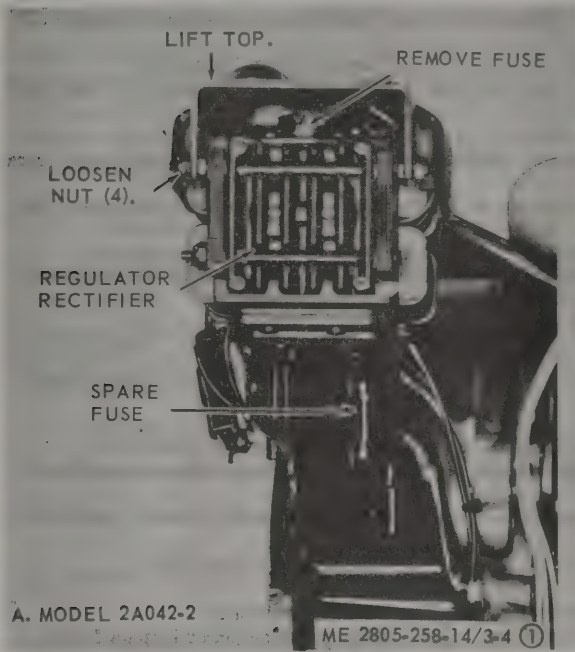


Figure 3-4 (1). Fuse, removal and installation.

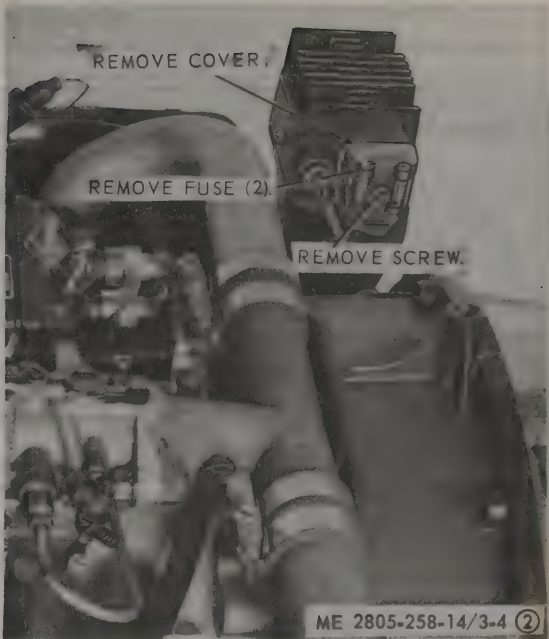


Figure 3-4(2)—Continued.

(2) Inspect for broken glass and a burned out condition.

(3) Replace a damaged or defective fuse.

c. Installation. Refer to figure 3-4 and install fuses.

Section V. TROUBLESHOOTING

3-10. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the military standard engines, or any of their components. Each malfunction stated is followed by a list of probable causes of the trouble.

The corrective action recommended is described opposite the probable cause.

3-11. Organizational Maintenance Troubleshooting

Refer to table 3-1 for organizational maintenance troubleshooting.

Table 3-1. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Engine fails to start.....	a. Fuel improper or fuel supply exhausted..	a. Provide proper fuel (para 2-6).
	b. Magneto contacts improperly adjusted or defective	b. Adjust or replace contacts (para 3-31).
	c. Spark plugs dirty, improperly adjusted or defective	c. Clean, adjust, or replace spark plugs (para 3-32).
	d. Fuel filter clogged.....	d. Clean filter (para 3-25).
	e. Starter fails to crank engine.....	e. Replace starter (para 3-33).
	f. Carburetor improperly adjusted or defective	f. Adjust or replace carburetor (para 3-27).
	g. Fuel pump defective.....	g. Replace pump (para 3-26).
	h. Spark plug cables defective.....	h. Replace cables (para 3-31).
	i. Automatic choke fails to operate.....	i. Adjust or replace choke (para 3-31).

Table 3-1. Troubleshooting—Continued

Malfunction	Probable cause	Corrective action
2. Engine fails to keep running-----	a. Fuel improper or supply exhausted----- b. Magneto contacts improperly adjusted or defective c. Fuel filter clogged----- d. Carburetor improperly adjusted or defective e. Fuel pump defective----- f. Automatic choke stuck in closed position and engine still warm	a. Provide proper fuel (para 2-6). b. Adjust or replace contacts (para 3-31). c. Clean filter (para 3-25). d. Adjust or replace carburetor (para 3-27). e. Replace pump (para 3-26). f. Use hand choke control or wait until engine cools.
3. Engine misses or runs erratically---	a. Spark plugs dirty, improperly adjusted or defective b. Carburetor improperly adjusted or defective c. Fuel filter clogged or defective----- d. Magneto contacts improperly adjusted or defective e. Spark plug cables defective----- f. Compression low in one or more cylinders	a. Clean, adjust, or replace plugs (para 3-32). b. Adjust or replace carburetor (para 3-27). c. Clean or replace filter (para 3-25). d. Adjust or replace contacts (para 3-31). e. Replace cables (para 3-31). f. Test compression (para 3-47) if low report condition to direct support maintenance.
4. Engine surges-----	a. Fuel supply low----- b. Carburetor improperly adjusted or defective c. Governor improperly adjusted or defective d. Fuel pump defective-----	a. Provide proper fuel (para 2-6). b. Adjust or replace carburetor (para 3-27). c. Adjust or replace governor (para 3-29). d. Replace pump (para 3-26).
5. Engine overheats-----	a. Air supply to engine restricted----- b. Engine shrouds dirty or defective----- c. Magneto improperly timed----- d. Carburetor improperly adjusted or defective e. Engine overloaded-----	a. Remove restriction. b. Clean or replace shrouds (para 3-17). c. Time magneto (para 3-31). d. Adjust or replace carburetor (para 3-27). e. Reduce load.
6. Engine lacks power-----	a. Air cleaner dirty----- b. Fuel filter clogged----- c. Carburetor improperly adjusted or defective d. Magneto improperly timed----- e. Fuel improper-----	a. Service air cleaner (para 3-7). b. Service filter (para 3-25). c. Adjust or replace carburetor (para 3-27). d. Time magneto (para 3-31). e. Provide proper fuel (para 2-6).
7. Engine oil consumption excessive---	a. Engine overheating----- b. Oil grade improper----- c. Crankcase breather clogged-----	a. Refer to 5 above. b. Provide proper grade of oil. Refer to current lubrication order. c. Clean breather (para 3-45).
8. Engine exhaust smoky-----	a. Crankcase overfilled----- b. Carburetor improperly adjusted or defective	a. Refer to current lubrication order and service crankcase. b. Adjust or replace carburetor (para 3-27).
9. Alternator output incorrect-----	a. Alternator defective----- b. Regulator-rectifier defective----- c. Regulator-rectifier defective-----	a. Replace alternator (para 3-34). b. Replace rectifier (para 3-35). c. Replace fuse (para 3-9).
10. Regulator rectifier defective-----	a. Regulator-rectifier does not change ac voltage to dc voltage b. Regulated dc voltage too high or too low c. No dc voltage output-----	a. Replace regulator (para 3-35). b. Replace regulator (para 3-35). c. Check and replace fuse or replace regulator (para 3-9 and 3-35).

Section VI. RADIO INTERFERENCE SUPPRESSION

3-12. General Methods Used to Attain Proper Suppression

Essentially, radio interference suppression is attained by providing a low-resistance path to ground for stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors. For general information on radio interference suppression, refer to TM 11-483.

3-13. Interference Suppression Components

The high-tension cables are encased in braided metal shields. They are connected to the spark plugs and the magneto.

3-14. Replacement of Suppression Components

a. *Bonding Strap (Model 2A042-2)*. Refer to figure 3-5 and replace bonding strap.

b. *High-Tension Cables*. For replacement of high-tension cables, refer to paragraph 3-31.

3-15. Testing of Radio Interference Suppression Components

Test capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equip-

NOTE: BONDING STRAP USED ON
EARLY MODEL 2A042-2 ONLY.

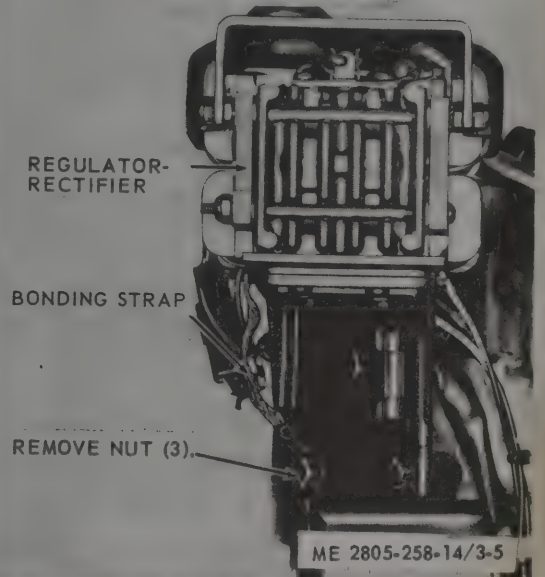


Figure 3-5. Bonding strap, removal and installation.

ment is not available and interference is indicated, isolate the cause of the interference by the trial-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

Section VII. COOLING SYSTEM

3-16. General

The military standard engines are cooled by air that is forced over the engine surfaces by a fan that is cast as an integral part of the flywheel. The cooling air is directed over the engine surfaces by shrouds and baffles. An oil pan baffle is provided to shut off the flow of cooling air over the oil pan during operation in extremely cold temperatures.

3-17. Top, Left, and Right Shrouds

a. Removal.

(1) Remove receptacle connector (para 3-36).

(2) Refer to figure 3-6 and remove top, left and right shrouds.

b. Cleaning and Inspection.

(1) Clean shrouds with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, dents, broken welds, and other damage.

(3) Replace an excessively damaged shroud.

c. Installation.

(1) Refer to figure 3-6 and install top, left, and right shrouds.

(2) Install receptacle connector (para 3-36).

3-18. Cylinder Baffles and Springs

a. Removal.

(1) Remove top and side shrouds (para 3-17).

(2) Refer to figure 3-7 and remove cylinder baffles and springs.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, distortion of springs, and other damage.

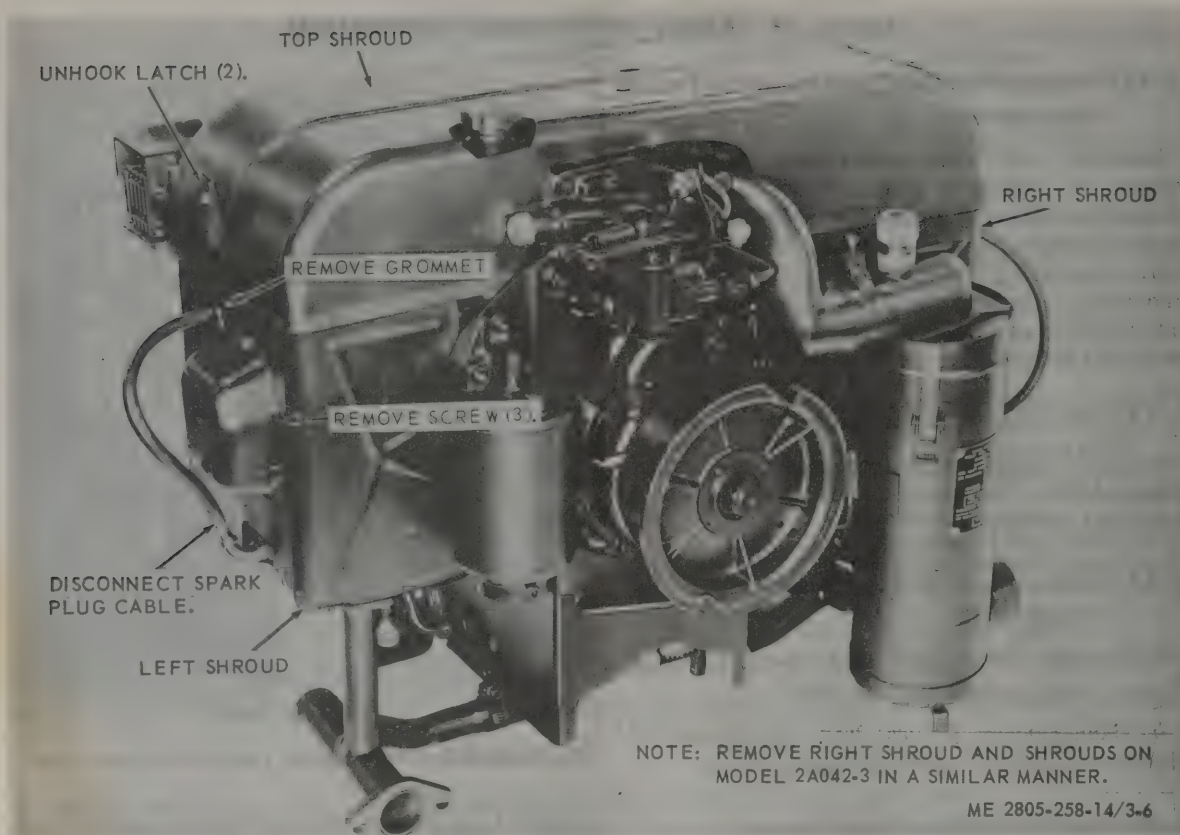


Figure 3-6. Top, left, and right shrouds, removal and installation.

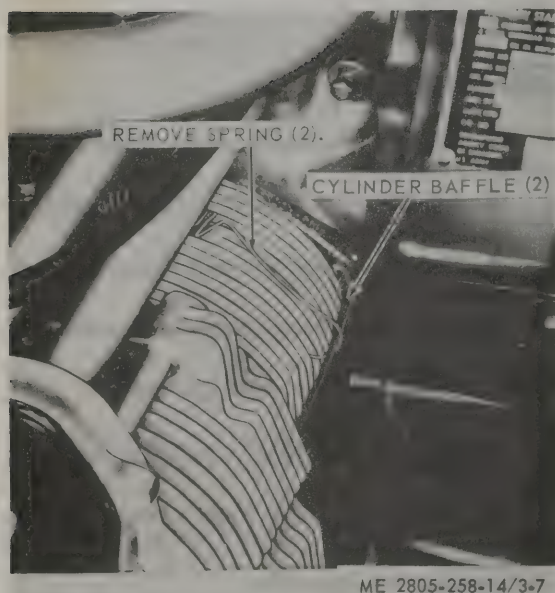


Figure 3-7. Cylinder baffles and springs, removal and installation.

(3) Replace a damaged or defective baffle or spring.

c. Installation.

(1) Refer to figure 3-7 and install cylinder baffles and springs.

(2) Install top and side shrouds (para 3-17).

3-19. Oil Pan Cover, Baffle Cover, Air Control and Front and Rear Engine Brackets

a. Removal.

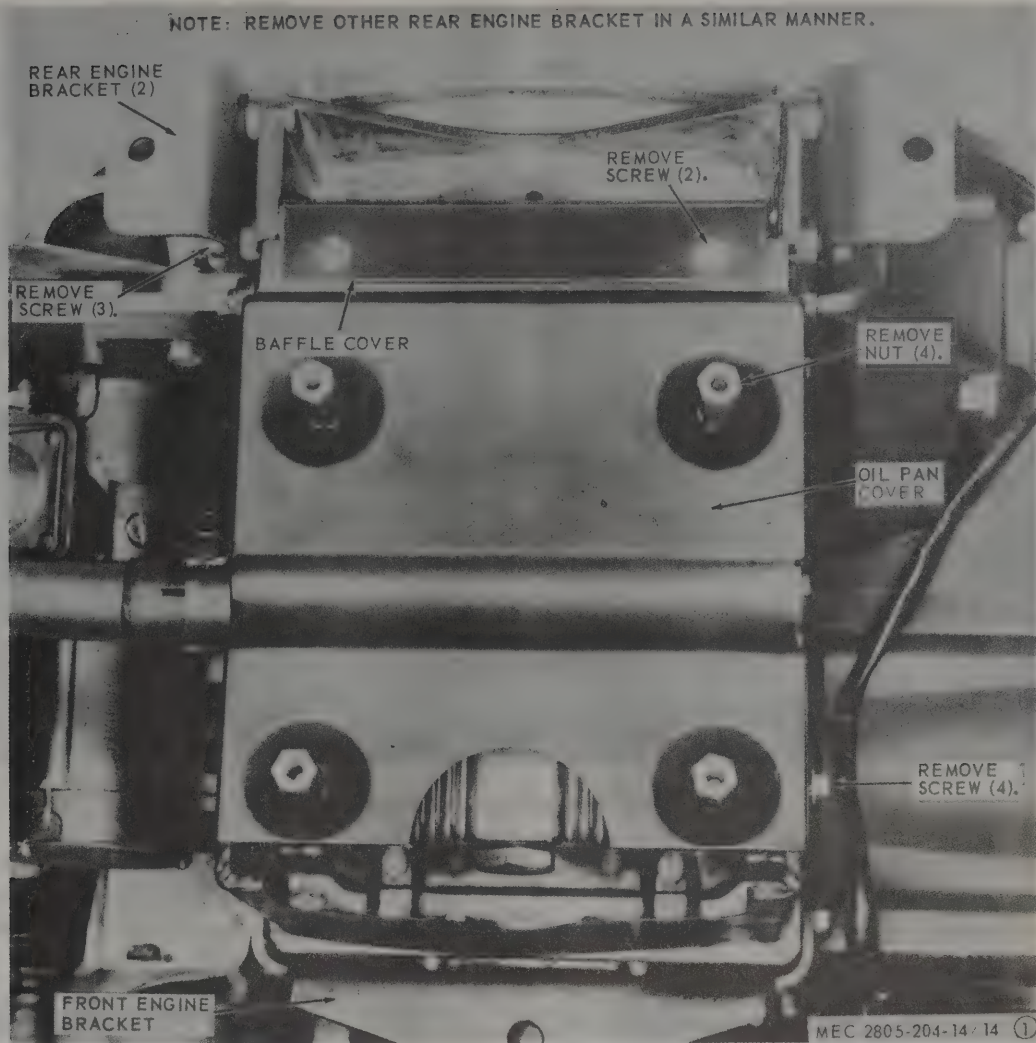
(1) Remove exhaust manifold and connecting pipe (par. 3-21).

(2) Refer to figure 3-8 and remove oil pan cover, baffle cover, air control, and front and rear engine brackets.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, dents, and other damage.



1 Oil pan cover and baffle cover

Figure 3-8. Oil pan cover and baffle cover air control and front and rear engine brackets, removal and installation.

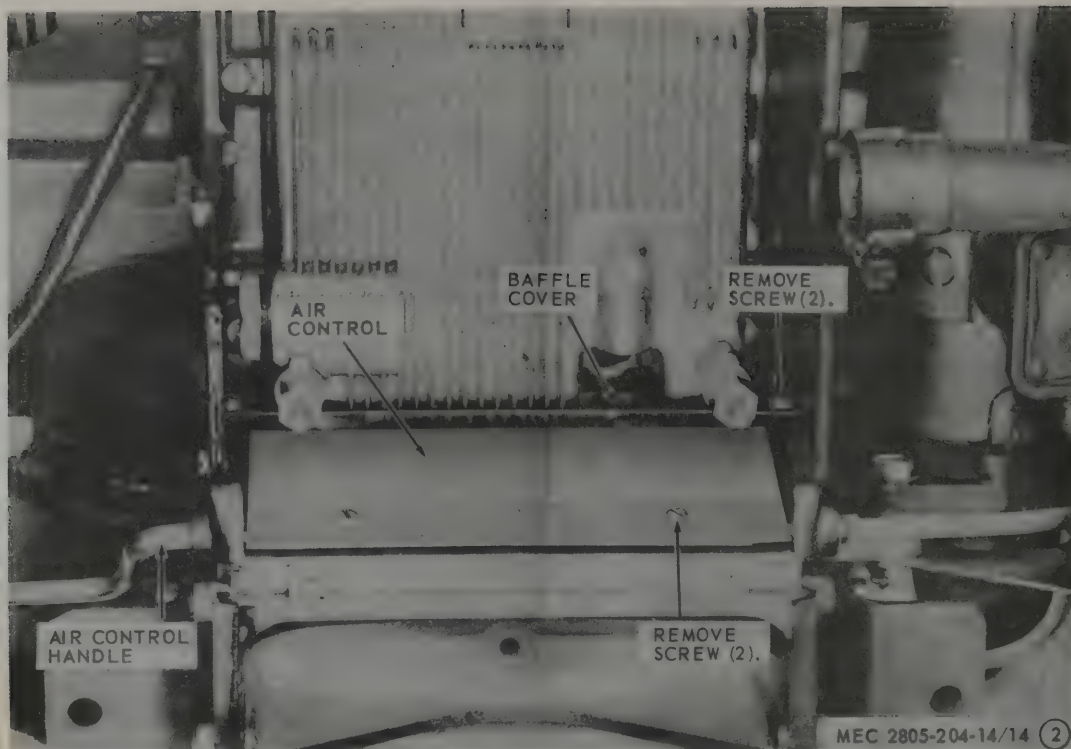
(3) Replace a damaged or defective oil pan cover, baffle cover, air control, and engine bracket.

c. Installation.

(1) Refer to figure 3-8 and install oil pan

cover, baffle cover, air control, and front and rear engine brackets.

(2) Install exhaust manifold and connecting pipe (para 3-21).



2 Air control and engine brackets

Figure 3-8—Continued.

Section VIII. EXHAUST SYSTEM

3-20. General

The air and fuel mixture is distributed from the carburetor to the individual cylinders through the intake manifold. Waste gases from the combustion chambers of the cylinder heads are expelled through the exhaust manifolds. The manifolds are connected by means of a connecting pipe.

3-21. Exhaust Manifolds and Connecting Pipe

a. Removal.

- (1) Remove preheater (para 3-49).
- (2) Refer to figure 3-9 and remove exhaust manifolds and connecting pipe.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, and leaks, and other damage. Remove and discard all gaskets.
- (3) Replace a damaged or defective exhaust manifold and connecting pipe.

Note. Refer to table 1-1 for torque data.

c. Installation.

- (1) Refer to figure 3-9 and install exhaust manifolds and connecting pipe.
- (2) Install preheater (para 3-49).

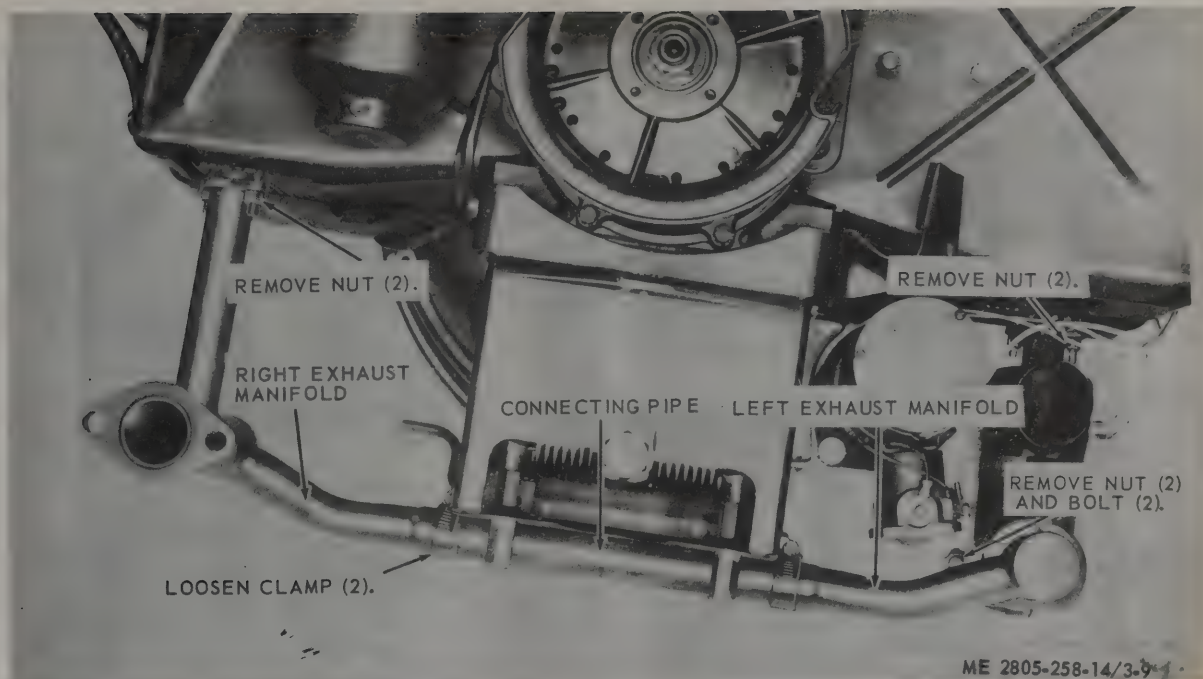


Figure 3-9. Exhaust manifolds and connecting pipe, removal and installation.

Section IX. FUEL SYSTEM

3-22. General

The fuel system of the military standard engines consists of an air cleaner, air cleaner adapter, fuel

filter, fuel pump, carburetor, governor, and intake manifolds. Carburetion is controlled by the governor through the throttle rod. These components

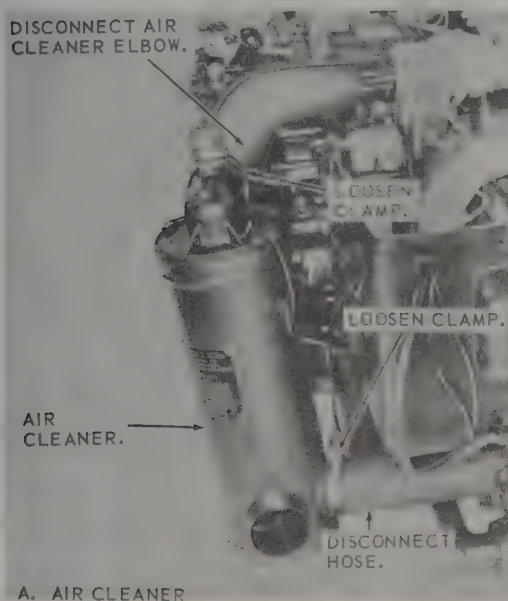


Figure 3-10. Air cleaner and support bracket, removal and installation.

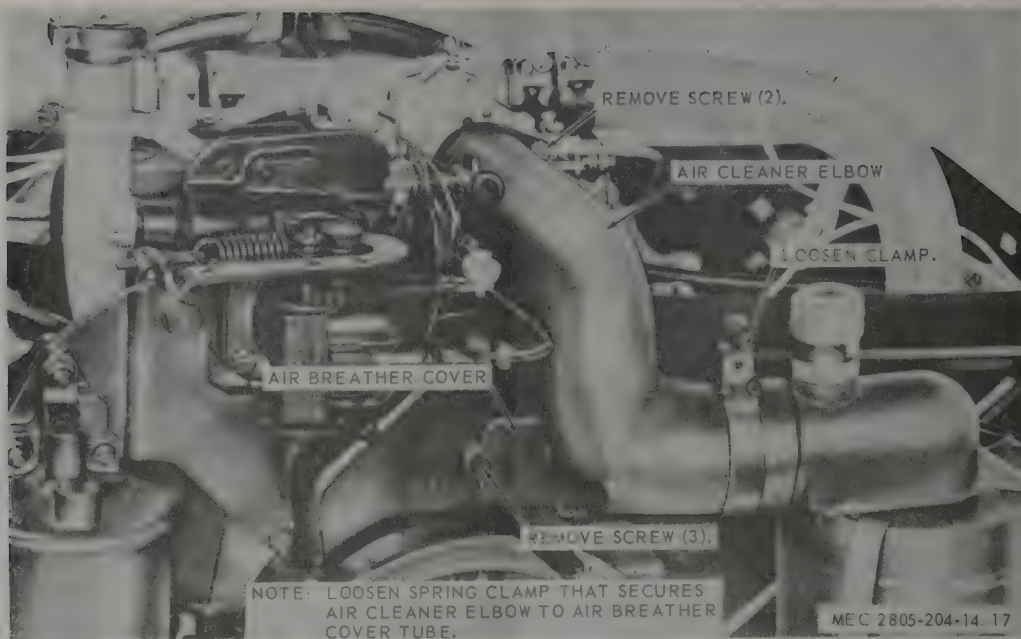


Figure 3-11. Air cleaner elbow and air breather cover, removal and installation.

comprise a balanced and fully adjustable system designed to keep the engine at a governed speed of 3,600 rpm, at rated load.

3-23. Air Cleaner and Support Bracket

a. *Removal.* Refer to figure 3-10 and remove air cleaner and support bracket.

b. *Cleaning and Inspection.*

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, dents, and other damage.

(3) Replace a damaged or defective air cleaner or support bracket.

c. *Installation.* Refer to figure 3-10 and install air cleaner and support bracket.

3-24. Air Cleaner Elbow and Air Breather Cover

a. *Removal.*

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-11 and remove air cleaner elbow and air breather cover.

b. *Cleaning and Inspection.*

(1) Clean the elbow with a clean cloth.

(2) Inspect for cracks, breaks, deterioration of rubber, and other damage.

(3) Replace a damaged or defective air cleaner elbow or air breather cover.

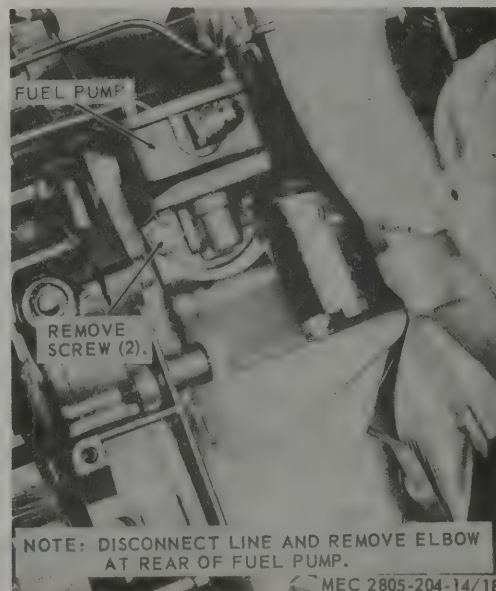


Figure 3-12. Fuel pump, removal and installation.

c. Installation.

(1) Refer to figure 3-11 and install air cleaner elbow and air breather cover.

(2) Install top shroud (para 3-17).

3-25. Fuel Filter

a. Removal. Remove fuel from the end item.

Note. The end item manufacturer's location and method of installation of the fuel filter will determine what steps are necessary to remove the fuel filter. Refer to the end item technical manual for removal instructions.

b. Cleaning and Inspection.

(1) Clean filter with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace a damaged or defective fuel filter.

c. Installation. Install fuel filter to the end item.

3-26. Fuel Pump

a. Removal.

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-12 and remove fuel pump.

b. Cleaning and Inspection.

(1) Clean fuel pump with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, leakage, and other damage. Remove and discard gasket.

(3) Replace a damaged or defective fuel pump.

Note. Refer to table 1-1 for torque data.

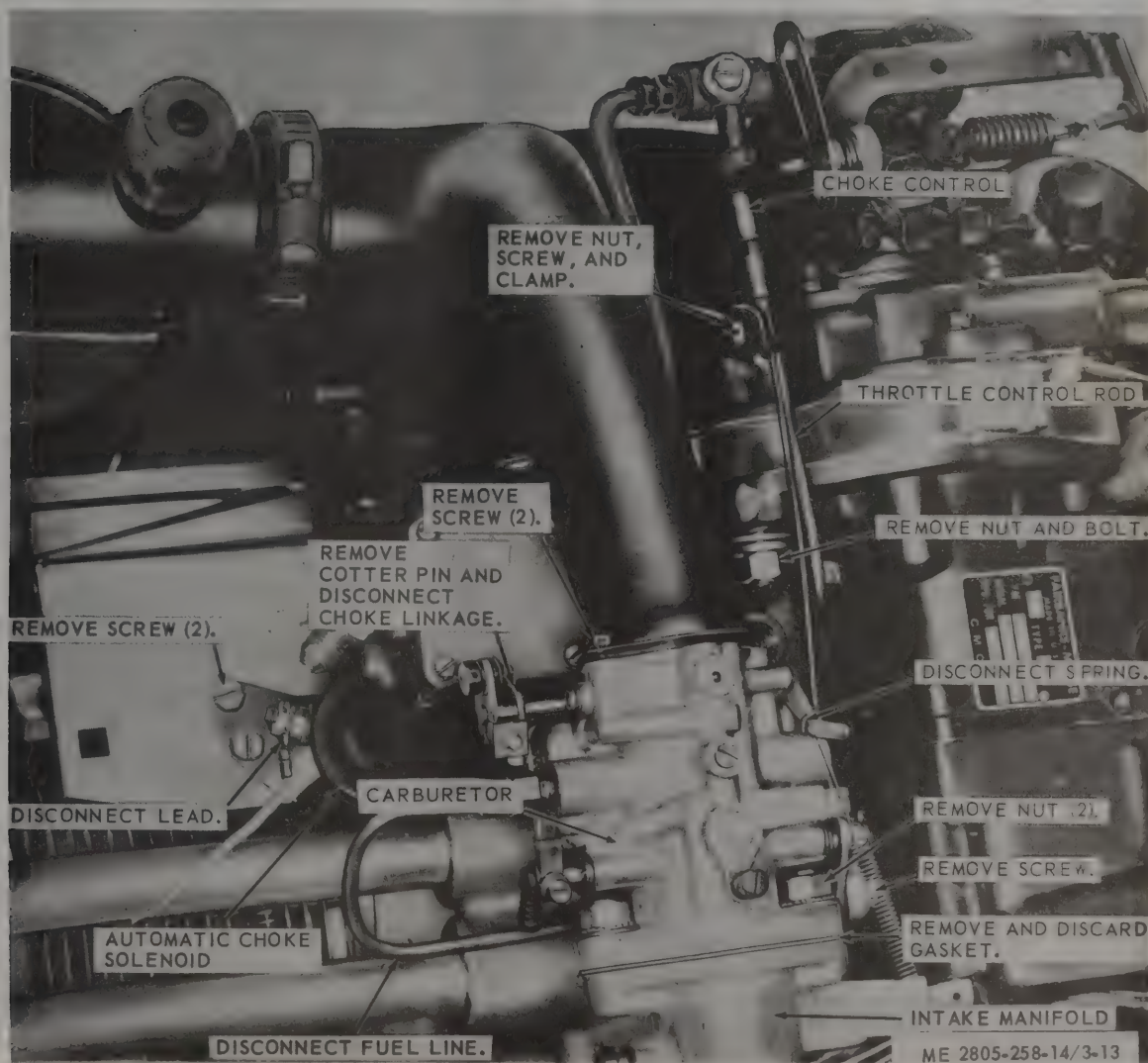


Figure 3-19. Carburetor and automatic choke, removal and installation.

c. Installation.

- (1) Refer to figure 3-12 and install fuel pump.
- (2) Install top shroud (para 3-17).

3-27. Carburetor and Automatic Choke

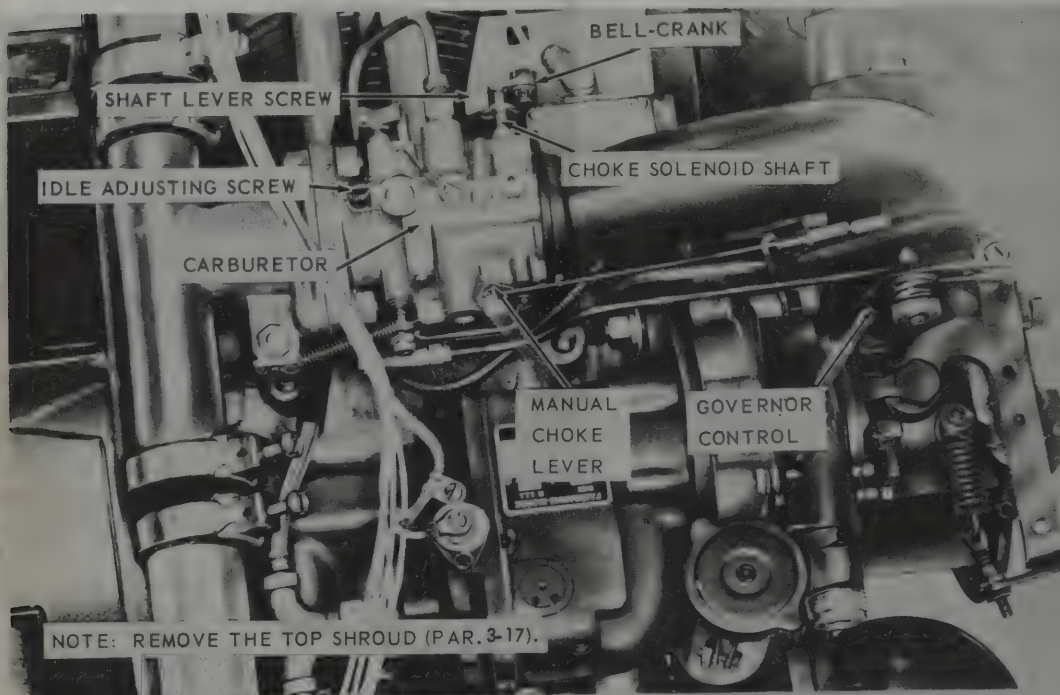
a. Removal.

- (1) Remove top shroud (para 3-17).

- (2) Refer to figure 3-13 and remove carburetor and automatic choke.

b. Cleaning and Inspection.

- (1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect carburetor for cracks, breaks, and leakage.
- (3) Inspect throttle shaft and choke shaft for excessive wear.



AUTOMATIC CHOKE SOLENOID ADJUSTMENT:

- STEP 1. PLACE MANUAL CHOKE LEVER IN VERTICAL POSITION.
- STEP 2. ADJUST BELL-CRANK ON CHOKE SHAFT 12 TO 15 DEGREES UP OR DOWN FROM HORIZONTAL.
- STEP 3. MAKE SURE THE SOLENOID PLUNGER BOTTOMS IN CHOKE SOLENOID BEFORE CHOKE BUTTERFLY JAMS IN CARBURETOR.

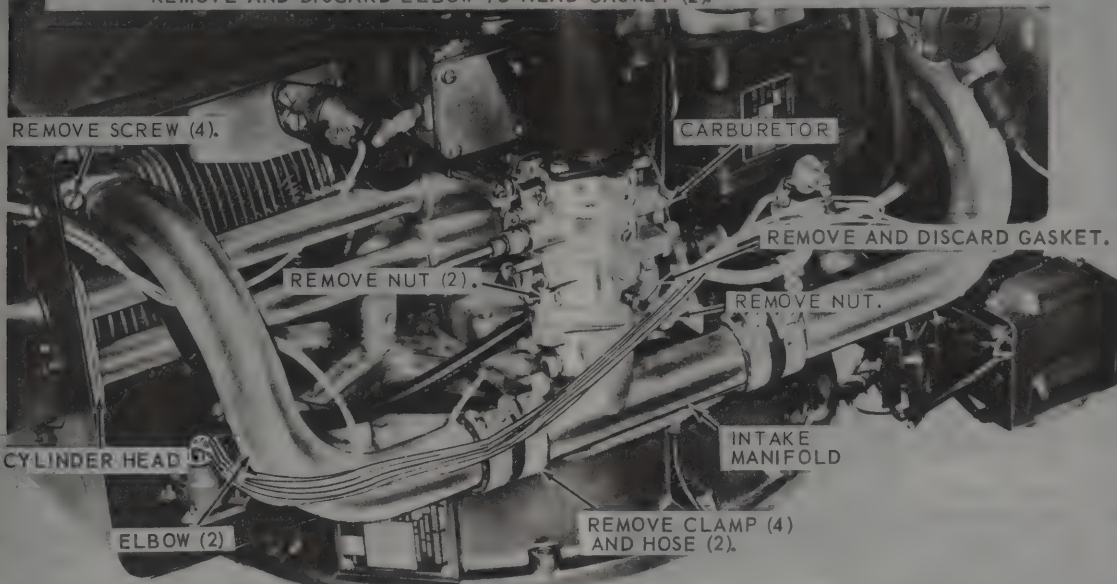
CARBURETOR ADJUSTMENT:

- STEP 1. ADJUST AUTOMATIC CHOKE SOLENOID.
- STEP 2. TURN IDLE ADJUSTING SCREW CLOCKWISE UNTIL SCREW IS SEATED, THEN TURN SCREW COUNTERCLOCKWISE ONE AND ONE-HALF TO TWO TURNS.
- STEP 3. REFER TO END ITEM TECHNICAL MANUAL AND SWITCH ON IGNITION SWITCH TO ENERGIZE AUTOMATIC CHOKE SOLENOID.
- STEP 4. PLACE GOVERNOR CONTROL IN IDLE POSITION AND OPERATE ENGINE UNTIL NORMAL OPERATING TEMPERATURE IS REACHED.
- STEP 5. TURN IDLE ADJUSTING SCREW CLOCKWISE OR COUNTERCLOCKWISE UNTIL ENGINE RUNS SMOOTHLY.

ME 2805-258-14/3-14

Figure 3-14. Carburetor and automatic choke adjustments.

NOTE: REMOVE INTAKE MANIFOLD AND ELBOW (2) AS A UNIT AND SEPARATE COMPONENTS.
REMOVE AND DISCARD ELBOW-TO-HEAD GASKET (2).



NOTE: REMOVE INTAKE MANIFOLDS, ELBOWS, AND HOSES FROM MODEL 2A042-3 IN SIMILAR MANNER.
ME 2805-258-14/3-15

Figure 3-15. Intake manifolds, elbows, and hoses, removal and installation.

(4) Inspect choke control and linkage for freedom of movement and excessive wear.

(5) Replace a damaged or defective choke control, carburetor and automatic choke.

c. Installation.

(1) Refer to figure 3-13 and install carburetor and automatic choke.

(2) Install top shroud (para 3-17).

d. Adjustment. Refer to figure 3-14 and adjust carburetor and automatic choke.

3-28. Intake Manifold, Elbows, and Hoses

a. Removal.

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-15 and remove intake manifold, elbows, and hoses.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Clean hoses with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(3) Inspect hoses for cracks, breaks, and deterioration.

(4) Inspect all other parts for cracks, breaks, and other damage.

(5) Replace a damaged or defective intake manifold, elbow, or hose.

Note. Refer to table 1-1 for torque data.

c. Installation.

(1) Refer to figure 3-15 and install intake manifolds, elbow, and hoses.

(2) Install top shroud (para 3-17).

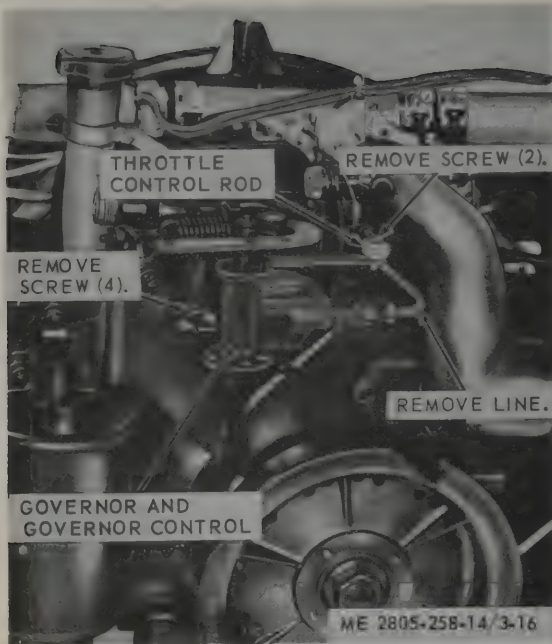


Figure 3-16. Governor, governor control, and throttle control rod, removal and installation.

3-29. Governor, Governor Control, and Throttle Control Rod

a. Removal.

- (1) Remove top shroud (para 3-17).
- (2) Refer to figure 3-16 and remove governor, governor control, and throttle control rod.

b. Cleaning and Inspection.

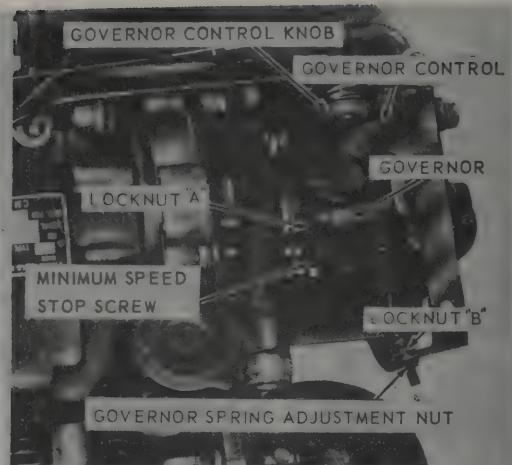
- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect governor housing and governor control for cracks, breaks, and other damage.
- (3) Inspect tachometer drive gear for cracks, breaks, and excessive wear.
- (4) Replace a damaged or defective governor, governor control or throttle control rod.

Note. Refer to table 1-1 for torque data.

c. Installation.

- (1) Refer to figure 3-16 and install governor, governor control, and throttle control rod.
- (2) Install top shroud (para 3-17).

d. Adjustment. Refer to figure 3-17 and adjust governor.



- STEP 1. LOOSEN LOCKNUT "A" AND TURN MINIMUM SPEED STOP SCREW COUNTERCLOCKWISE 4 TURNS TO PREVENT ENGINE OVERSPEED.
 - STEP 2. START ENGINE AND ALLOW TO WARM 30 MINUTES.
 - STEP 3. LOOSEN GOVERNOR CONTROL KNOB AND PLACE GOVERNOR CONTROL IN GOVERN POSITION. TIGHTEN KNOB.
 - STEP 4. APPLY LOAD AND TURN MINIMUM SPEED STOP SCREW CLOCKWISE TO OBTAIN ENGINE SPEED OF 3,600 RPM. TIGHTEN LOCKNUT "A".
 - STEP 5. DISENGAGE LOAD AND CHECK ENGINE SPEED. IF SPEED DOES NOT EXCEED 3,708 RPM, NO FURTHER ADJUSTMENT IS NECESSARY. IF SPEED EXCEEDS 3,708 RPM, PERFORM STEPS 6 AND 7.
 - STEP 6. LOOSEN LOCKNUT "B" AND TURN GOVERNOR SPRING ADJUSTMENT NUT CLOCKWISE 4 TURNS TO REDUCE NO-LOAD SPEED. TIGHTEN LOCKNUT "B".
 - STEP 7. PERFORM STEPS 4 AND 5.
- NOTE: IF NO-LOAD SPEED IS ADJUSTED TOO CLOSE TO LOAD SPEED, INSTABILITY OR HUNTING WILL OCCUR. IF INSTABILITY OCCURS, ADJUST GOVERNOR SPRING ADJUSTMENT NUT TO OBTAIN NO-LOAD SPEED OF 3,708 RPM; THEN PERFORM STEPS 4 AND 5 TO OBTAIN STABILITY.

MEC 2805-204-14/23

Figure 3-17. Governor adjustment.

Section X. ELECTRICAL SYSTEM

3-30. General

The electrical systems on each of the engines is essentially the same. The components consist of a magneto, spark plugs, starter, and alternator. Refer to wiring diagram (fig. 1-2).

3-31. Magneto and Spark Plug Cables

a. Removal.

- (1) Remove governor (para 3-29).
- (2) Refer to figure 3-18 and remove magneto and spark plug cables.

b. Cleaning and Inspection.

- (1) Clean magneto with an approved cleaning solvent and dry thoroughly.
- (2) Clean spark plug cables with a soft, clean cloth dampened with an approved cleaning solvent and dry thoroughly.

(3) Inspect magneto for cracks, breaks, and other damage.

(4) Inspect cables for defective insulation and other damage.

(5) Replace a damaged or defective magneto or cable.

Note. Refer to table 1-1 for torque data.

c. Installation and Timing.

(1) Refer to figure 3-19 and position magneto for installation.

(2) Refer to figure 3-18 and install magneto and spark plugs.

(3) Refer to figure 3-20 and time engine.

(4) Install governor (para 3-29).

d. Contact Adjustment, Removal, and Installation. Refer to figure 3-21 and remove, install and adjust contacts.

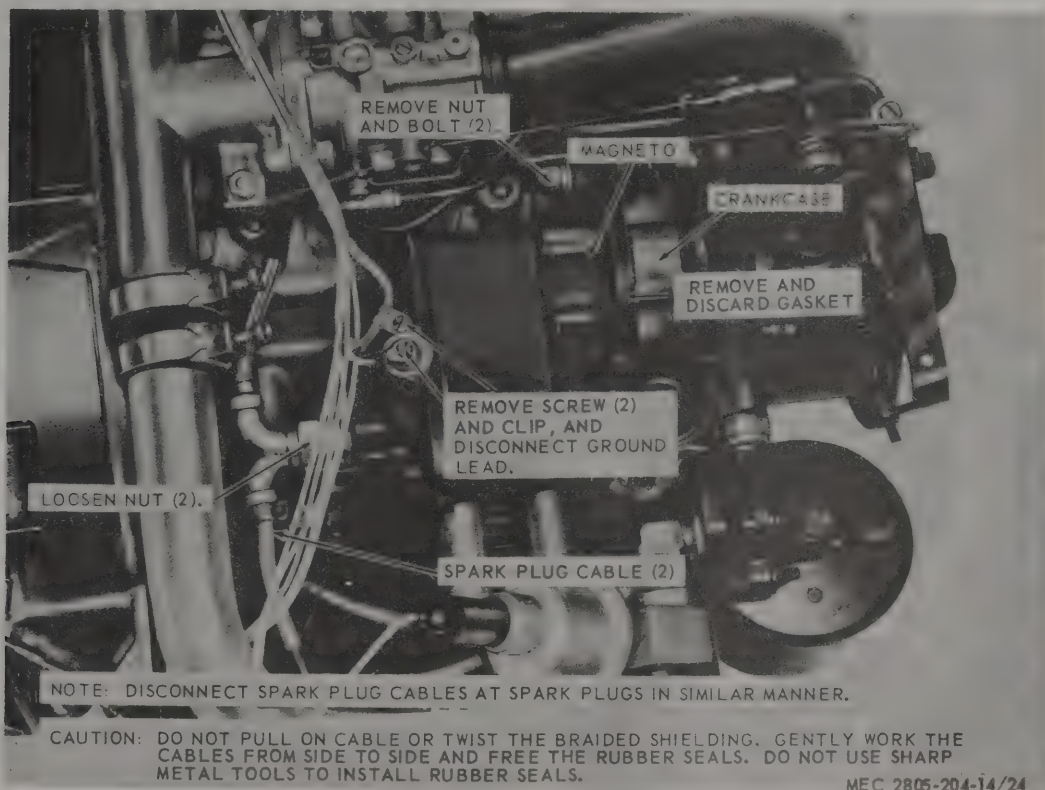
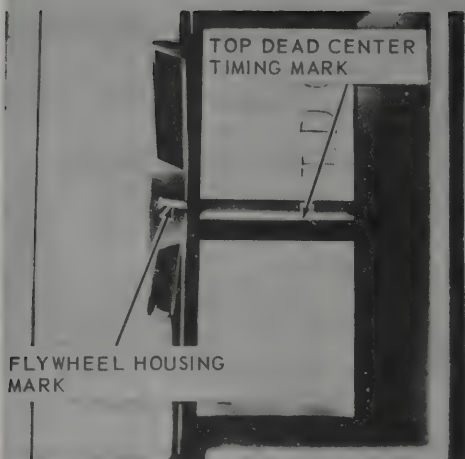


Figure 3-18. Magneto and spark plug cables, removal and installation.

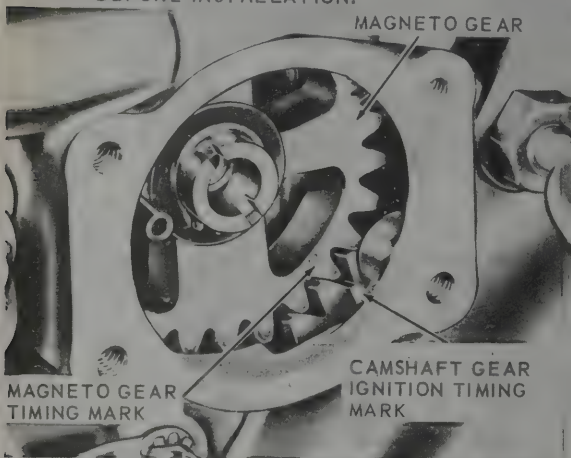


FLYWHEEL HOUSING MARK

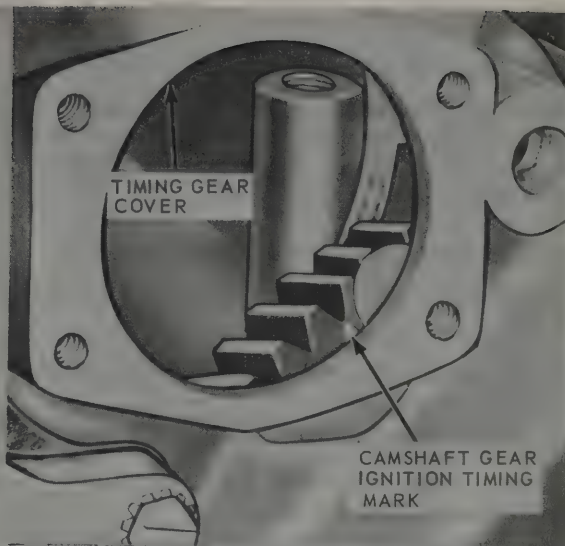
STEP 1. REMOVE SPARK PLUG FROM NUMBER ONE CYLINDER

STEP 2. INSERT THUMB IN SPARK PLUG HOLE AND TURN PULLEY UNTIL AIR ESCAPING BY THUMB INDICATES NUMBER ONE CYLINDER IS ON COMPRESSION STROKE. CONTINUE TO TURN UNTIL TDC TIMING MARK ALINES WITH FLYWHEEL HOUSING MARK. INSTALL SPARK PLUG.

NOTE: POSITION MAGNETO GASKET ON MAGNETO BEFORE INSTALLATION.



STEP 4: TURN MAGNETO GEAR CLOCKWISE AND POSITION MAGNETO SO MAGNETO GEAR TIMING MARK ALINES WITH CAMSHAFT GEAR IGNITION TIMING MARK.



NOTE: POSITION MAGNETO GASKET ON MAGNETO BEFORE INSTALLATION.

STEP 3. WITH MARKS ALINED AS DESCRIBED IN STEP 2, TURN PULLEY UNTIL CAMSHAFT GEAR IGNITION TIMING MARK APPEARS IN OPENING IN TIMING GEAR COVER.

NOTE: WHEN MAGNETO GEAR IS INSTALLED OR REPLACED, THE MAGNETO GEAR TIMING MARK MUST BE POSITIONED TO POINT IN SAME GENERAL DIRECTION AS THE TIMING MARK ON THE COUPLING SHELL PLATE OF MAGNETO.

ME 2805-258-14/3-19

Figure 3-19. Magneto alignment and positioning

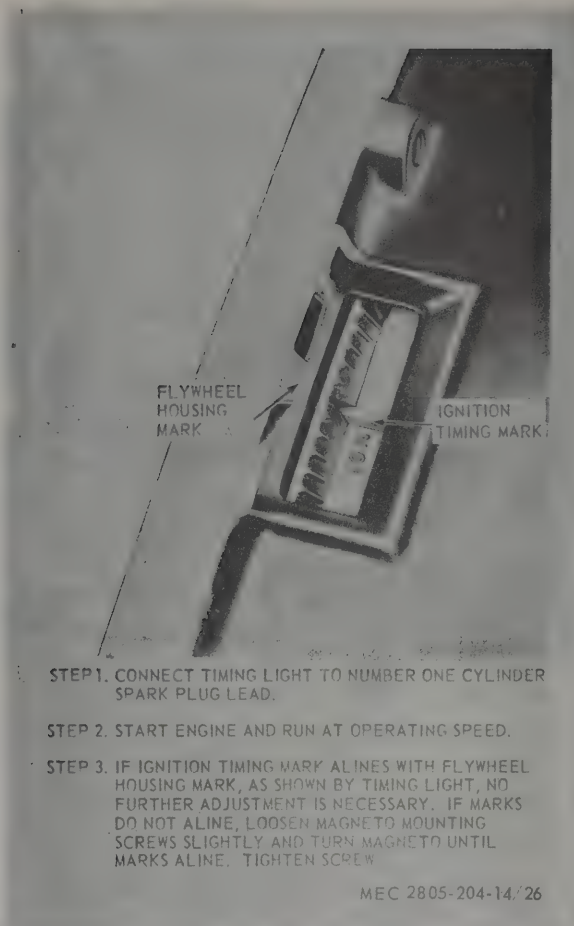


Figure 3-20. Engine timing.

e. Contacts and Condenser.

(1) **Removal.** Refer to figure 3-21 and remove contacts and condenser.

(2) Cleaning and Inspection.

(a) Clean contacts and condenser with a clean, dry, lint-free cloth.

(b) Inspect contacts for corrosion, pitting, and excessive burning.

(c) Test condenser on a coil and condenser tester for shorts or other defects.

(d) Replace a damaged or defective part.

(3) **Installation.** Refer to figures 3-21 and install contacts and condenser.

3-32. Spark Plugs

a. Removal. Refer to figure 3-22 and remove spark plugs.

b. Cleaning and Inspection.

(1) Clean spark plugs in a compressed air spark plug cleaner. Remove all abrasive material with dry, compressed air.

(2) Inspect plugs for excessive burning and cracked or broken ceramic insulation.

(3) Test spark plug on a spark plug tester.

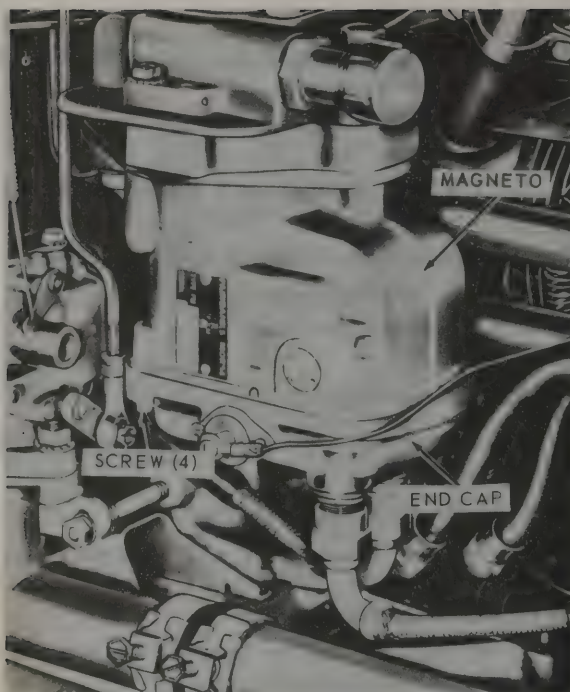
(4) Replace a damaged or defective spark plug.

c. Adjustment. Measure electrode gap with a spark plug gage or a thickness gage. The desired clearance is 0.030 inch. Adjust the clearance by bending the side electrode until an adjustment of 0.030 is obtained.

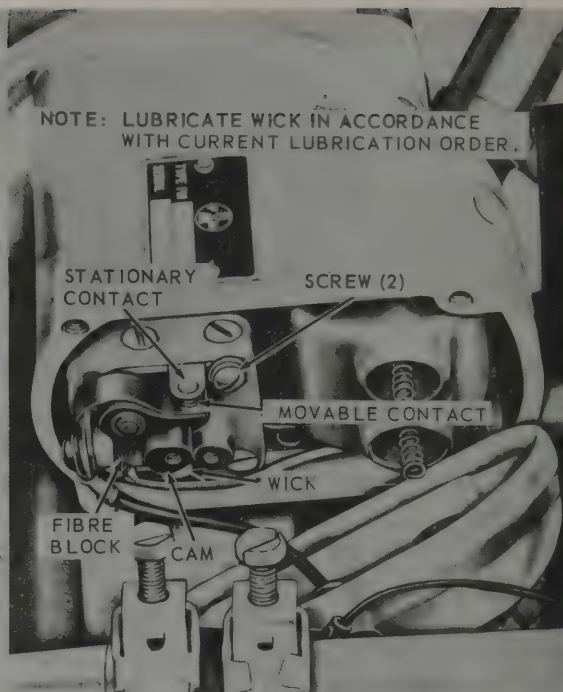
Caution. Do not bend center electrode.

Note. Refer to table 1-1 for torque data.

d. Installation. Refer to figure 3-22 and install spark plugs.



- STEP 1. REMOVE TOP SHROUD (PAR.3-17).
 STEP 2. REMOVE SCREW (4) AND REMOVE MAGNETO END CAP AND GASKET FROM MAGNETO.

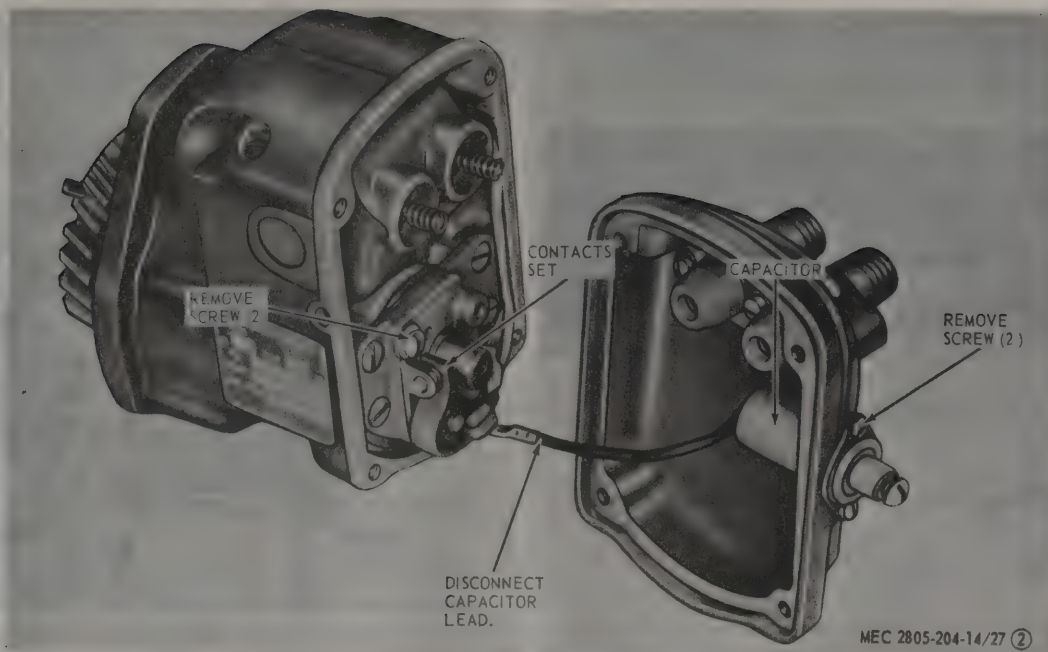


- STEP 3. TURN CAM UNTIL FIBRE BLOCK IS AT HIGHEST POINT ON CAM.
 STEP 4. LOOSEN SCREW (2) AND INSERT 0.015 INCH THICKNESS GAGE BETWEEN STATIONARY CONTACT AND MOVABLE CONTACT.
 STEP 5. MOVE STATIONARY CONTACT TO OBTAIN SLIDING FIT BETWEEN GAGE AND CONTACTS.
 STEP 6. TIGHTEN SCREW (2).
 STEP 7. CHECK CLEARANCE AND ADJUST IF NECESSARY.
 STEP 8. POSITION GASKET AND MAGNETO END CAP ON MAGNETO AND SECURE WITH SCREW (4).
 STEP 9. INSTALL TOP SHROUD (PAR.3-17).

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1 Contact adjustment

Figure 3-21. Contacts and condenser, adjustment, removal and installation.



2 Contacts and condenser, removal and installation.

Figure 3-21—Continued.

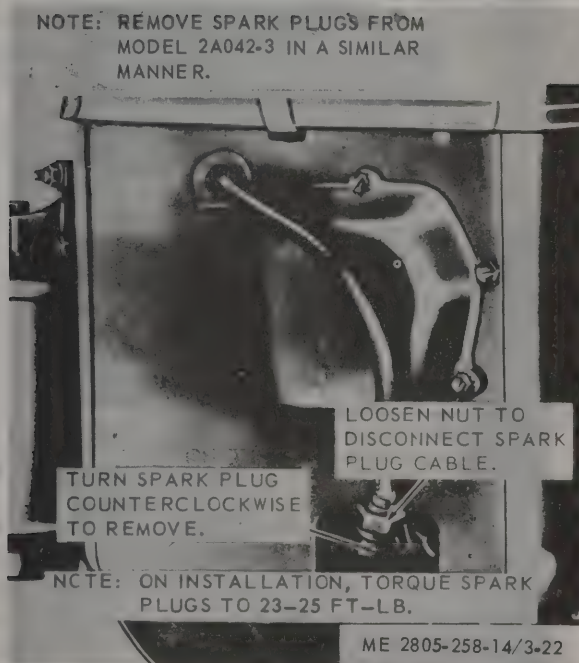


Figure 3-22. Spark plugs, removal and installation.

3-33. Starter

a. *On Equipment Testing.* Refer to TM 5-764.

b. *Removal.* Refer to figure 3-23 and remove starter.

c. *Cleaning and Inspection.*

(1) Clean starter with an approved cleaning solvent and dry thoroughly.

(2) Inspect starter for cracks, breaks, and other damage.

(3) Replace a damaged or defective starter.

Note. Refer to table 1-1 for torque data.

d. *Installation.* Refer to figure 3-23 and install starter.

3-34. Alternator

a. *Removal.* Refer to figure 3-24 and remove alternator.

b. *Cleaning and Inspection.*

(1) Clean rotor and stator with an approved cleaning solvent and dry thoroughly.

(2) Inspect the rotor for cracks, breaks, and other damage.

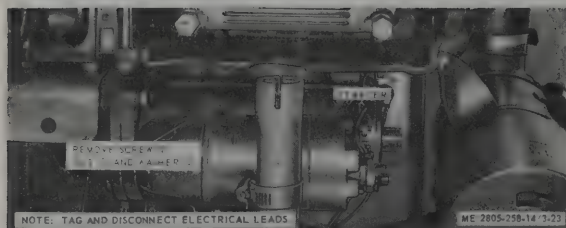


Figure 3-23. Starter, removal and installation.

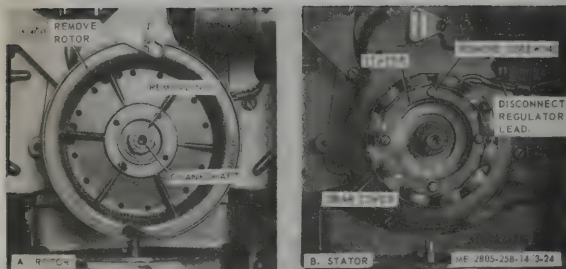


Figure 3-24. Alternator, removal and installation.

(3) Inspect stator for broken or frayed insulation and winding defects.

(4) Replace a damaged or defective starter.

Note. Refer to table 1-1 for torque data.

d. Installation. Refer to figure 3-24 and install alternator.

3-35. Regulator-Rectifier and Bracket

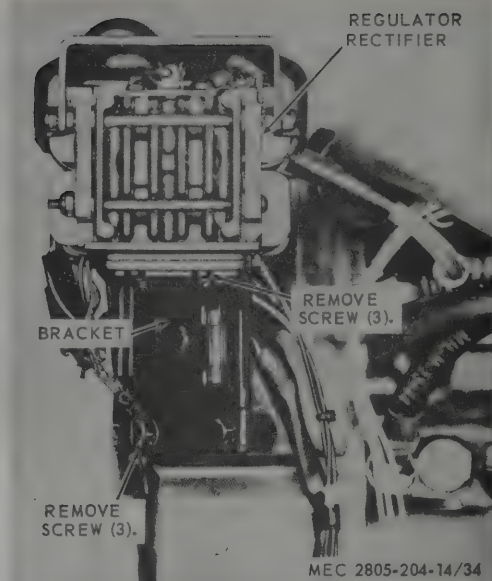
a. Removal.

(1) Remove fuse (para 3-9).

(2) Refer to figure 3-25 and remove regulator-rectifier and bracket.

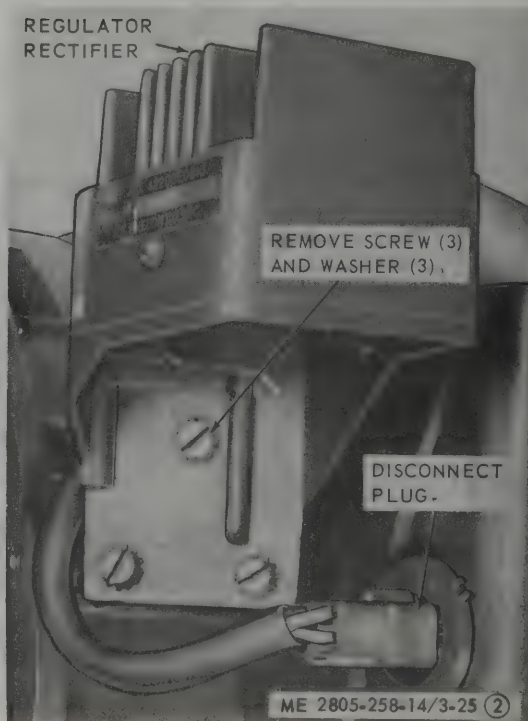
b. Cleaning and Inspection.

(1) Clean regulator-rectifier with an approved cleaning solvent and dry thoroughly.



1 Model 2A042-2

Figure 3-25. Regulator-rectifier, removal and installation.



2 Model 2A042-3

Figure 3-25—Continued

(2) Inspect for cracks, breaks, frayed or broken wires, and other damage.

(3) Inspect bracket for cracks, breaks, and other damage.

(4) Replace a damaged or defective regulator-rectifier, bracket, or adapter cable (model 2A042-3 only).

c. Installation.

(1) Refer to figure 3-25 and install the regulator-rectifier.

(2) Install fuse (para 3-9).

d. Testing.

(1) Run the alternator at 3,400 to 3,600 rpm, either with engine or an external power source.

(2) Connect ac alternator leads to the regulator-rectifier.

(3) Connect dc regulator-rectifier leads to a battery or batteries, with an ammeter and a voltmeter in the circuit. Meter reading should be as follows:

Low charge battery	Full charge battery
Amperes (approx) 5-9	(approx) 0-1.5
Volts (approx) 25.0	(approx) 28.5

Note. Depending upon condition of batteries used, meter readings can be anywhere between the minimum and maximum listed above.

(4) Disconnect dc leads at battery; meter readings should be as follows:

Amperes	0.0
Volts (approx)	28.5

3-36. Receptacle Connector and Wiring Harness

a. Removal.

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-26 and remove receptacle connector and wiring harness.

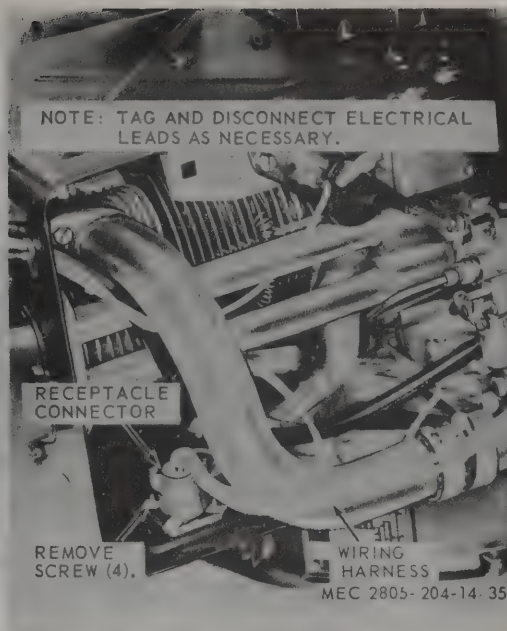


Figure 3-26. Receptacle connector and wiring harness, removal and installation.

b. Cleaning and Inspection.

(1) Clean the receptacle connector and wiring harness with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, oil soaked insulation, and other damage.

(3) Replace a damaged receptacle connector or wiring harness.

c. Installation.

(1) Refer to figure 3-26 and install receptacle connector and wiring harness.

(2) Install top shroud (para 3-17).

Section XI. LUBRICATION SYSTEM

3-37. General

The military standard engines are provided with full-pressure lubrication systems. The oil level in each engine is shown on the oil gage rod. Oil is drawn from the oil pan by the oil pump and forced through oil filter hoses to a full-flow oil filter and returned to the moving components in the engine. Excess oil from the rocker arms at each cylinder is returned to the engine crankcase through a rocker box hose.

3-38. Oil Gage Rod and Oil Filler Tube

a. Removal. Refer to figure 3-27 and remove oil gage rod and oil filler tube.

b. Cleaning and Inspection.

(1) Clean oil gage rod and oil filler tube with an approved cleaning solvent and dry thoroughly.

Note. Do not remove oil filler tube unless absolutely necessary.

(2) Inspect for illegible markings and other damage.

TURN OIL GAGE ROD COUNTERCLOCKWISE
AND WITHDRAW FROM OIL FILLER TUBE.

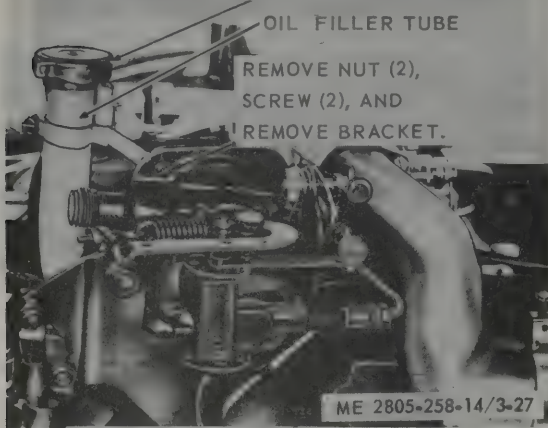


Figure 3-27. Oil gage rod, and oil filler tube, removal and installation.

(3) Replace a damaged oil gage rod and oil filler tube.

c. Installation. Refer to figure 3-27 and install oil gage rod and oil filler tube.

3-39. Oil Filter, Bracket, and Lines

a. Removal.

(1) Remove top shroud (para 3-17).

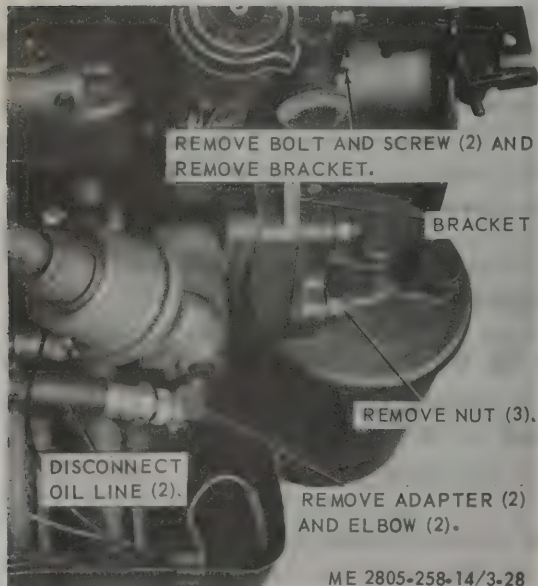


Figure 3-28. Oil filter, bracket, and lines, removal and installation.

(2) Refer to figure 3-28 and remove oil filter, bracket, and lines.

b. Cleaning and Inspection.

(1) Clean filter with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace a damaged or defective oil filter, bracket, or line.

c. Installation.

(1) Refer to figure 3-28 and install oil filter, bracket, and lines.

(2) Install top shroud (para 3-17).

3-40. Rocker Box Hoses

a. Removal.

(1) Remove right and left shrouds (para 3-17).

(2) Refer to figure 3-29 and remove rocker box hoses.

b. Cleaning and Inspection.

(1) Clean hoses with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect hoses for signs of splitting, cracking, and other damage.

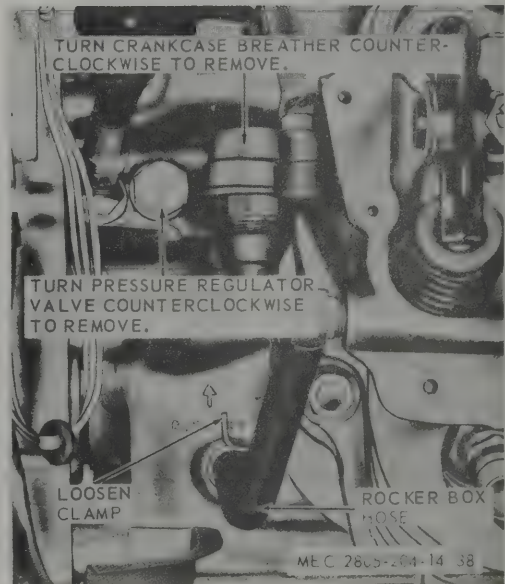


Figure 3-29. Rocker box hoses, pressure regulator valve, and crankcase breather, removal and installation.

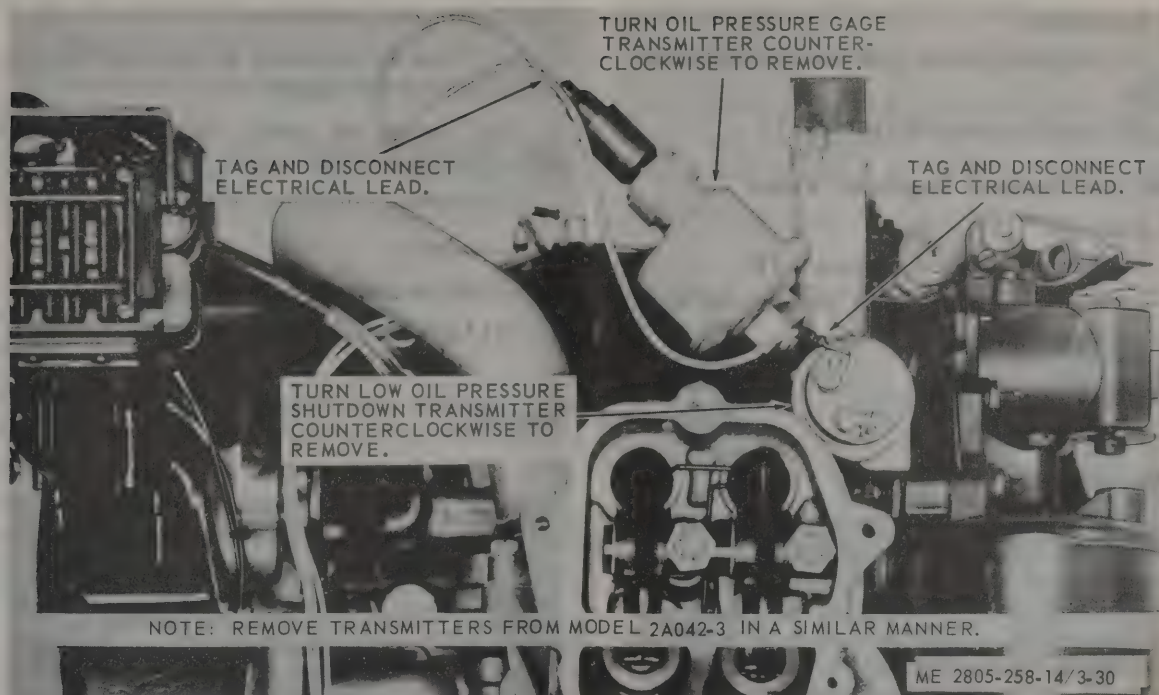


Figure 3-30. Low oil pressure shutdown transmitter, and oil pressure gage transmitter, removal and installation.

(3) Replace damaged or defective rocker box hoses.

c. Installation.

(1) Refer to figure 3-29 and install rocker box hoses.

(2) Install right and left shrouds (para 3-17).

3-41. Low Oil Pressure Shutdown Transmitter

a. Removal.

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-30 and remove low oil pressure shutdown transmitter.

b. Cleaning and Inspection.

(1) Clean transmitter with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, loose terminals, and other damage.

(3) Replace a damaged or defective low oil pressure shutdown transmitter.

c. Testing. With a multimeter, test for continuity between terminals of transmitter. Continuity should not be indicated.

d. Installation.

(1) Refer to figure 3-30 and install low oil pressure shutdown transmitter.

(2) Install top shroud (para 3-17).

3-42. Oil Pressure Gage Transmitter

a. Removal.

(1) Remove top shroud (para 3-17).

(2) Refer to figure 3-30 and remove pressure gage transmitter.

b. Cleaning and Inspection.

(1) Clean transmitter with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, loose terminals and other damage.

(3) Replace a damaged or defective transmitter.

c. Testing. With a multimeter, test for continuity between terminals of the transmitter. Continuity should not be indicated.

d. Installation.

- (1) Refer to figure 3-30 and install transmitter.
- (2) Install top shroud (para 3-17).

3-43. Oil Pressure Regulator Valve

a. Removal.

- (1) Remove top shroud (para 3-17).
- (2) Refer to figure 3-29 and remove regulator valve.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, damaged threaded parts, distortion of the spring, and other damage.
- (3) Replace a damaged or defective valve.

c. Installation.

- (1) Refer to figure 3-29 and install valve.
- (2) Install top shroud (para 3-17).

Section XII. ENGINE

3-44. General

This section contains information on the maintenance of the engine components which are the responsibility of organizational maintenance personnel. These include the crankcase breather, air breather cover and breather reed. A paragraph on compression testing instructions is included in this section to enable organizational maintenance personnel to perform preventive maintenance and to help evaluate the condition of the engine.

3-45. Crankcase Breather

a. Removal.

Note. When removing crankcase breather, loosen manifold at both ends and use a suitable wrench.

- (1) Remove top shroud (para 3-17).
- (2) Refer to figure 3-29 and remove crankcase breather.

b. Cleaning and Inspection.

- (1) Clean breather with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, and other damage.
- (3) Replace a damaged or defective breather.

c. Installation.

- (1) Refer to figure 3-29 and install breather.
- (2) Install top shroud (para 3-17).

3-46. Crankcase Breather Reed (Model 2A042-2)

a. Removal.

- (1) Remove air cleaner elbow and breather cover (para 3-24).
- (2) Refer to figure 3-31 and remove crankcase breather reed.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.

NOTE: MODEL 2A042-3 IS NOT EQUIPPED WITH BREATHER REED.

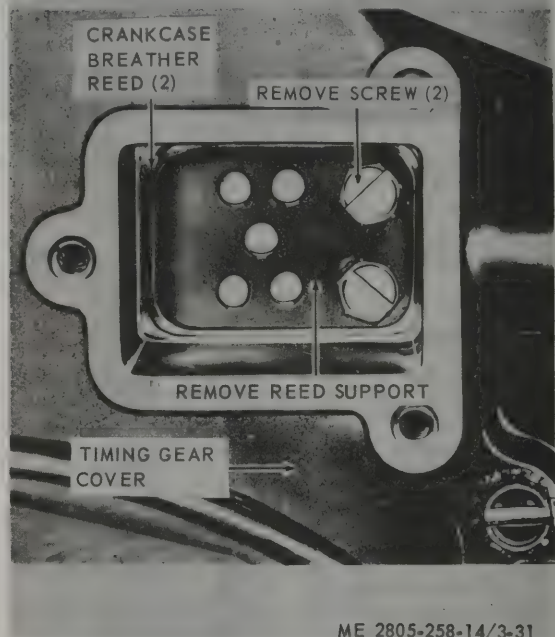


Figure 3-31. Crankcase breather reed, removal and installation.

- (2) Inspect for cracks, breaks, and other damage.
- (3) Replace a damaged or defective breather reed.

c. Installation.

- (1) Refer to figure 3-31 and install crankcase breather reed.
- (2) Install air cleaner elbow and breather cover (para 3-24).

3-47. Compression Testing

- a. Remove spark plugs (para 3-32).
- b. Insert a compression gage in one of the spark plug holes.
- c. Crank engine and record the reading indicated on DA Form 2404. The correct reading is 115 to 125 psi.

d. Test each cylinder as in c above.

e. Install spark plugs (para 3-32).

f. If gage readings are below 90 psi or if readings vary more than 10 psi between cylinders, report the condition to direct support maintenance.

Section XIII. WINTERIZATION SYSTEM

3-48. General

The military standard engines are equipped with exhaust manifold preheaters and a thermoswitch which activates the automatic choke. The preheater is clamped around the exhaust manifold and provides a source of heated air to the engine fuel system during extreme cold weather operation.

3-49. Preheater

a. *Removal.* Refer to figure 3-32 and remove preheater.

b. *Cleaning and Inspection.*

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace a damaged or defective preheater.

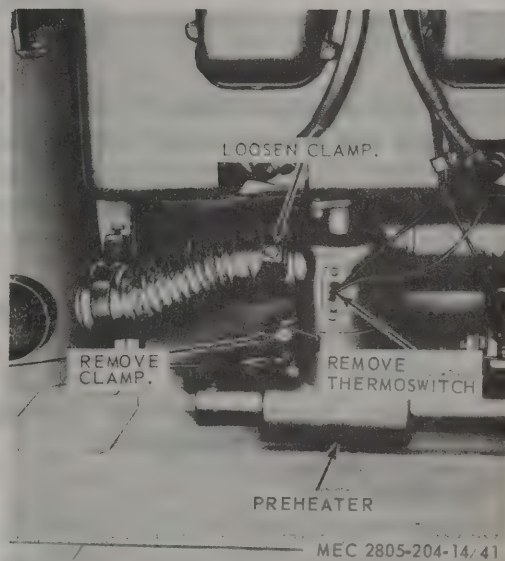


Figure 3-32. Preheater, removal and installation.

c. *Installation.* Refer to figure 3-32 and install preheater.

CHAPTER 4

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

4-1. Scope

These instructions are published for the use of direct support and general support maintenance personnel maintaining the military standard engines. They provide information on the maintenance of the engine, which is beyond the scope of

the tools, equipment, personnel, or supplies normally available to using organizations.

4-2. Forms and Records

DA Forms and records used for equipment maintenance will be only those prescribed in TM 38-750.

Section II. DESCRIPTION AND DATA

4-3. Description

For a complete description of the military standard engines, refer to paragraph 1-5.

4-4. Tabulated Data

a. *General.* This paragraph contains all tabulated data pertinent to direct support and general support maintenance personnel.

b. *Nut and Bolt Torque Data.* Refer to table 4-1.

Table 4-1. Nut and Bolt Torque Data

Camshaft plate screws	4-5 ft-lb
Crankshaft diaphragm screws	3.4-4.7 ft-lb
Crankshaft nut	70 ft-lb
Connecting rod bolts	24-26 ft-lb
Cylinder head nuts	22-25 ft-lb
Cylinder studs to case	10.5-12.5 ft-lb
Fan housing	24-25 ft-lb
Flywheel fan	80-83 ft-lb
Front gear cover	5.8-6.7 ft-lb
Oil pan assembly	3.3-4.6 ft-lb

Oil pan to case	4.2-5 ft-lb
Oil pump cover	5-6 ft-lb
Pulley	80-83 ft-lb
Rocker arm cover	1-2 ft-lb
Rocker shaft nuts	6-7 ft-lb

c. Engine Overhaul Data.

Bore	3.00
Stroke	3.00
Compression ratio	6.9 to 1
Brake horsepower	16.7 at 3,600 rpm
Cylinder compression (minimum)	110 psi
Spark plug gap	.028-.033
Magneto contact gap	.013-.017
Maximum runout on flywheel	.006
Carburetor float level	25/64 to 27/64 from casting opposite hinge
Fuel pump outlet pressure	3 to 4.5 psi
Air blower impeller clearance to housing	.016-.051

d. Engine Repair and Replacement Standards.

Table 4-2 lists the manufacturer's sizes, tolerances, desired clearances, and maximum allowable wear for the engine valve mechanism.

Table 4-2. Repair and Replacement Standards

Component	Manufacturers dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Min	Max	Min	Max		
CAMSHAFT:						
Bearing journal dia						
Front.....	0.9365	0.9370	0.001	0.0025	0.9363	
Rear.....	.8740	.8745	.002	.003	.8738	
Cam lift.....	.2437	.2487			.005	
End play.....	.002	.008				0.010
Bearing inside dia.....	.938	.939				
Bearing journal to bearing clearance.....	.001	.0025	.001	.0025		.0027

Table 4-2. Repair and Replacement Standards (cont'd).

Component	Manufacturers dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Min	Max	Min	Max		
CRANKSHAFT:						
Main bearing journals						
Front.....	1.6255	1.6260	.0015	.0027		
Rear.....	1.6255	1.6260	.0015	.0027		
Connecting rod journal od.....	1.4975	1.4980	.0004	.0019		
End play.....	.003	.010				.015
Crankshaft bearings						
Main bearing id.....	1.6275	1.6282				
Main bearing od.....	1.7545	1.7560				
CONNECTING RODS						
Connecting rod bearing clearance.....	.0004	.0029				
Side clearance.....	.006	.014	.006	.014		.017
Conn rod bearing id.....	1.4984	1.5004				
Conn rod bearing od.....	1.624	1.625				
Piston pin:						
Length.....	2.485	2.500				
Diameter.....	.8591	.8593				
Piston pin clearance in bearing.....	.0001	.0006				.0008
PISTON:						
Cylinder inside dia.....	2.9990	2.9995	(A size) (B, C, and D size .005 larger)			
Piston pin hole dia.....	.8591	.8594			.8602	
Piston pin bushing od.....	.9165	.9185				
Piston pin bushing id.....	.8594	.8597			.8599	
Skirt od.....	2.9962	2.9972	(A size) B, C, and D size, .0005 larger)		2.9955	
Piston to cylinder clearance.....	.0018	.0033				.004
Piston ring groove						
Depth Top.....	2.652	2.661				
Second.....	2.63	2.641				
Third.....	2.631	2.641				
Piston ring groove						
Width Top.....	.1200	.1210				
Second.....	.0955	.0965				
Third.....	.188	.189				
Piston rings						
Width spacer.....	.145	.152				
Top.....	.140	.150				
Second.....	.129	.139				
Third.....	.129	.139				
Thickness spacer.....	.0235	.0245				
Top.....	.093	.094				
Second.....	.093	.094				
Third.....	.186	.187				
Gap clearance spacer.....	0.010	0.060				
Top.....	.010	.020				
Second.....	.010	.020				
Third.....	.010	.020				
Side clearance.....	N/A	N/A				
First.....	.0015	.0045				
Second.....	.0015	.0035				
Third.....	.001	.003				
VALVES:						
Exhaust						
Length.....	4.393	4.408			0.3335	
Stem diameter.....	.3405	.3415				
Head diameter.....	1.120"	1.130				
Seat angle.....	45°0'	45°15'				
Stem to guide clear.....	.003L	.0045L			.006L	
Clear valve to lift.....	N/A	N/A				
Minimum Edge—Thickness of valve head relative to seat surface.....					.031	

Table 4-2. Repair and Replacement Standards (cont'd)

Component	Manufacturers dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Min	Max	Min	Max		
VALVES (cont'd):						
Intake						
Length.....	4.393	4.408				0.3385
Stem diameter.....	.3405	.3415				
Head diameter.....	1.370	1.380				
Seat angle.....	45°0'	45°15'				
Stem to guide clear.....	.0005L	.002L				.0045L
Clear valve to lift.....						
VALVE SPRINGS:						
Length (valve open).....	1.120					
Pounds load (valve open)	100	110				90
Length (valve closed).....	1.440					
Pounds load (valve closed).....	57	63				47
Valve Guide						
Length.....	1.797	1.828				
Outside dia.....	.5005	.5010				
Inside dia.....	.3445	.3450				.3465
Intake						
Length.....	1.797	1.828				
Outside dia.....	.5005	.5010				
Inside dia.....	.3420	.3425				.3450
Valve Seat Inserts Exhaust						
Outside dia.....	1.2595	1.2605				
Inside dia998	1.003				
Seat angle.....	44°30'	45°0'				
Intake						
Outside dia.....	1.4895	1.4905				
Inside dia.....	1.210	1.220				
Seat angle.....	44°30'	45°0'				
Valve Tappets						
Outside dia.....	.8740	.8745				.8747
		B and S				
Clearance in guide.....	.0015	.003				.0032
Rocker Arms						
Rocker shaft od.....	.6246	.6248	0.0005	0.0013		.6240
Rocker arm bushing.....	.7495	.7505				
Rocker arm bushing id.....	.6253	.6259				
Cylinders						
Bore.....	2.9990	2.9995	(A size) (B, C, and D size .0005 larger)			.004
Out of round.....	.0000	.0005				.025
Taper.....	.000	.001				
Oil Pump						
Gear to end cover tolerance0043	.0097				
Gear tooth tolerance od.....	1.527	1.528				
Timing Gear Tooth Tolerance.....	.002	.004				0.006

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-5. Special Tools and Equipment

The special tools required to perform direct support and general support maintenance on the military standard engine are listed in table 4-3 and appendix B of this manual. The references and illustrations indicating the use of these tools are listed in the table. The five-digit number preceding the stock number is the Federal supply code number for the manufacturer of the tool. No

special equipment is required by direct support and general support personnel for performing maintenance on the military standard engine.

4-6. Direct Support and General Support Maintenance Repair Parts

Direct support and general support maintenance repair parts are listed and illustrated in TM 5-2805-258-24P.

Table 4-3. Special Tools

Item	FSN or Part No.	Reference		Use
		Fig.	Para	
Driver, oil seal.....	(97403) 13214E9-630	-----	4-12	Oil seal installation.
Driver, oil seal.....	(97403) 13214E9-631	-----	4-13	Oil seal installation.
Remover, oil seal.....	(97403) 13214E9-632	-----	4-12	Oil seal removal.

4-7. Specially Designed Tools and Equipment

No specially designed tools or equipment are required to perform direct support and general sup-

port maintenance on the military standard engines.

Section IV. TROUBLESHOOTING

4-8. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the military standard engines, or any of their components. Each malfunction stated is followed by a list of probable causes of the trouble.

The corrective action recommended is described opposite the probable cause.

4-9. Direct Support and General Support Maintenance Troubleshooting

Refer to table 4-4 for direct support and general support maintenance troubleshooting.

Table 4-4. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Engine fails to start or fails to keep running.	a. Piston rings defective	a. Replace rings (para 5-6).
	b. Camshaft or camshaft gear defective....	b. Replace camshaft or gear (para 4-17).
	c. Crankshaft or crankshaft gear defective..	c. Replace crankshaft or gear (para 5-8).
2. Engine misses or runs erratically...	a. Cylinder worn or defective.....	a. Replace cylinder (para 5-6).
	b. Valves sticking or burned.....	b. Clean valves, grind valve faces, or replace valves (para 5-2).
	c. Valve spring broken.....	c. Replace spring (para 5-2).
	d. Tappet defective.....	d. Replace tappet (para 4-15).
	e. Rush rod defective.....	e. Replace rod (para 4-15).
	f. Camshaft defective.....	f. Replace camshaft (para 4-17).
	g. Piston broken or piston rings worn, broken or stuck	g. Replace rings or pistons (para 5-6).
3. Engine lacks power.....	a. Piston rings worn or stuck.....	a. Replace rings (para 5-6).
	b. Cylinder worn.....	b. Replace cylinder (para 5-6).
4. Engine coil consumption excessive...	a. Piston rings worn, broken, or stuck	a. Replace rings (para 5-6).
	b. Pistons worn or broken.....	b. Replace piston (para 5-6).
	c. Valve guides worn.....	c. Replace guides (para 5-2).
	d. Cylinder worn.....	d. Replace cylinder (para 5-6).
	e. Engine front or rear oil seal defective...	e. Replace seals (para 4-12 or 4-13).
5. Engine excessively noisy.....	a. Connecting rod bearings worn...	a. Replace bearings (para 5-6).
	b. Rocker arms or shafts defective..	b. Replace arms or shafts (para 4-15).
	c. Camshaft gear worn.....	c. Replace gear (para 4-17).
	d. Crankshaft gear worn.....	d. Replace gear (para 5-8).
6. Engine exhaust smoky.....	a. Piston rings worn, stuck, or broken....	a. Replace rings (para 5-6).
	b. Pistons worn or cracked	b. Replace pistons (para 5-6).
	c. Cylinder worn.....	c. Replace cylinder (para 5-6).

Section V. FLYWHEEL, FLYWHEEL HOUSING, FRONT AND REAR OIL SEAL, AND TIMING GEAR COVER

4-10. General

This section contains information on the maintenance of the flywheel, flywheel housing, and front and rear oil seal which is the responsibility of direct support and general support maintenance personnel.

4-11. Flywheel and Flywheel Housing

a. Removal.

- (1) Remove starter (para 3-33).
- (2) Remove regulator-rectifier (para 3-35).
- (3) Remove rear engine brackets (para 3-19).
- (4) Using a suitable puller, refer to figure 4-1 and remove flywheel and flywheel housing.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, and other damage.
- (3) Replace a damaged or defective flywheel or housing.

c. Installation.

- (1) Refer to figure 4-1 and install flywheel and housing.
- (2) Install rear engine brackets (para 3-19).
- (3) Install regulator-rectifier (para 3-35).
- (4) Install starter (para 3-33).

4-12. Rear Oil Seal

a. Removal.

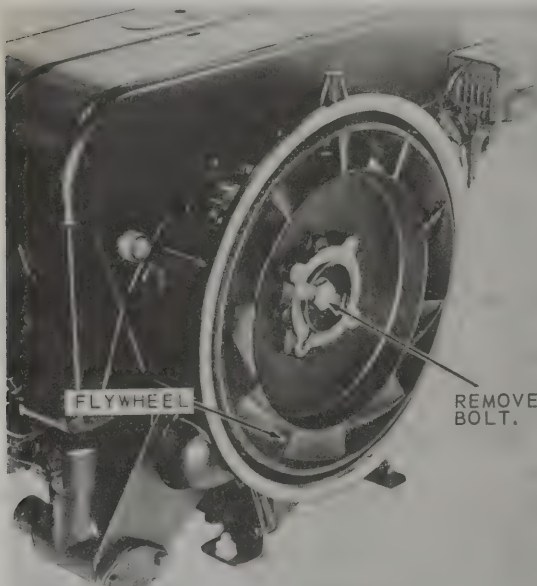
- (1) Remove flywheel (para 4-11).
- (2) Refer to figure 4-1 and remove rear oil seal.

b. Cleaning and Inspection.

- (1) Clean the seal with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, scores, and other damage.
- (3) Replace a damaged or defective rear oil seal.

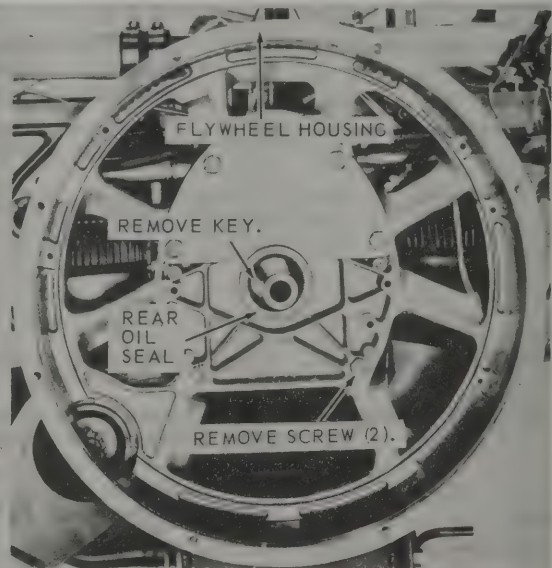
c. Installation.

- (1) Using oil seal driver, refer to figure 4-1 and install rear oil seal.
- (2) Install flywheel (para 4-11).



NOTE: TORQUE BOLT TO 80-83 FT-LB.

A. FLYWHEEL.



B. FLYWHEEL HOUSING AND REAR OIL SEAL.

ME 2805-258-14/4-1

Figure 4-1. Flywheel, flywheel housing, and rear oil seal, removal and installation.

4-13. Timing Gear Cover and Front Oil Seal

a. Removal.

- (1) Remove alternator (para 3-34).
- (2) Remove governor (para 3-29).
- (3) Remove oil filter and bracket (para 3-39).
- (4) Remove throttle control rod bracket (para 3-29).
- (5) Remove oil filler tube bracket (para 3-38).
- (6) Refer to figure 4-2 and remove timing gear cover and front oil seal.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect for cracks, breaks, scores, wear, and other damage.
- (3) Replace a damaged front oil seal and timing gear cover.

c. Installation.

- (1) Refer to figure 4-2 and install front oil seal and timing gear cover.
- (2) Install oil filler tube bracket (para 3-38).

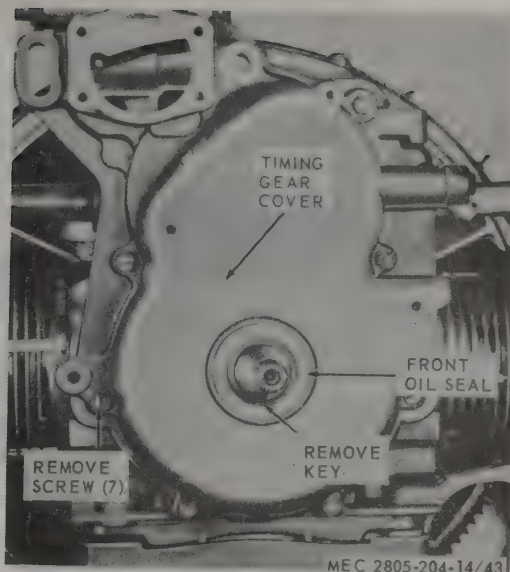


Figure 4-2. Timing gear cover and front oil seal, removal and installation.

- (3) Install throttle control rod bracket (para 3-29).
- (4) Install oil filter and bracket (para 3-39).
- (5) Install governor (3-29).
- (6) Install alternator (para 3-34).

Section VI. ROCKER ARM COVER, ROCKER ARMS, PUSH RODS AND TAPPET

4-14. General

The military standard engines are of the valve-in-head type. The valves are actuated by cam-shaft-driven, hydraulic valve tappets, push rods, and rocker arms. The tappets, push rods, and rocker arms are arranged to form a bellcrank lever system to reverse the direction of motion imparted by the push rods.

4-15. Rocker Arm Cover, Rocker Arms, Push Rods and Tappets

a. Removal.

- (1) Remove right and left shrouds (para 3-17).
- (2) Refer to figure 4-3 and remove rocker arm covers, rocker arms, push rods, and tappets.

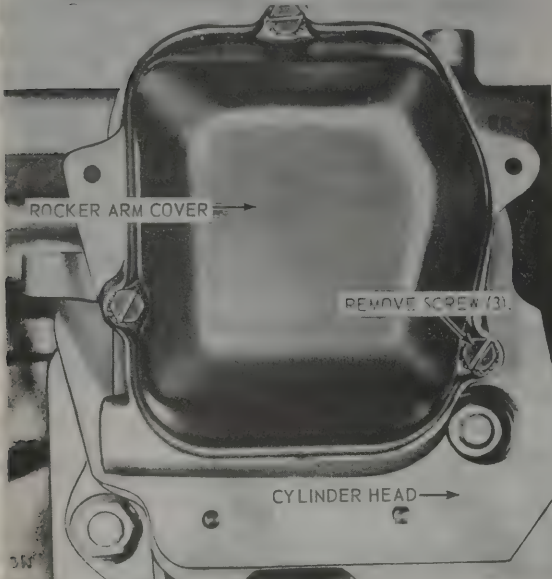
b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
- (2) Inspect the bottom surfaces of the tappets for pitting, scoring, and excessive wear. Operate the plunger in the tappets to inspect for proper operation.
- (3) Inspect the rocker arms for excessive wear and breakage.
- (4) Inspect the rocker arm shafts for signs of wear and scoring.
- (5) Replace a damaged or defective rocker arm cover, rocker arm push rod, and tappet.

c. Installation.

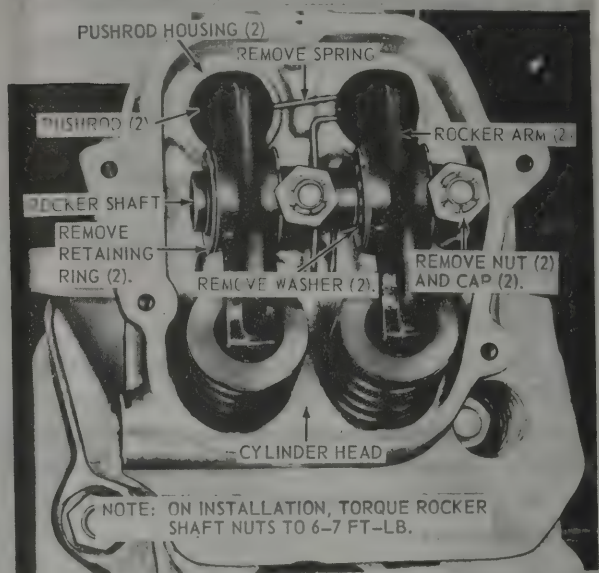
- (1) Refer to figure 4-3 and install rocker arm covers, rocker arms, push rods, and tappets.
- (2) Install right and left shrouds (para 3-17).

NOTE:
AFTER ROCKER ARM COVER REMOVAL,
REMOVE AND DISCARD GASKET. REMOVE
REMAINING ROCKER ARM COVERS IN A
SIMILAR MANNER.

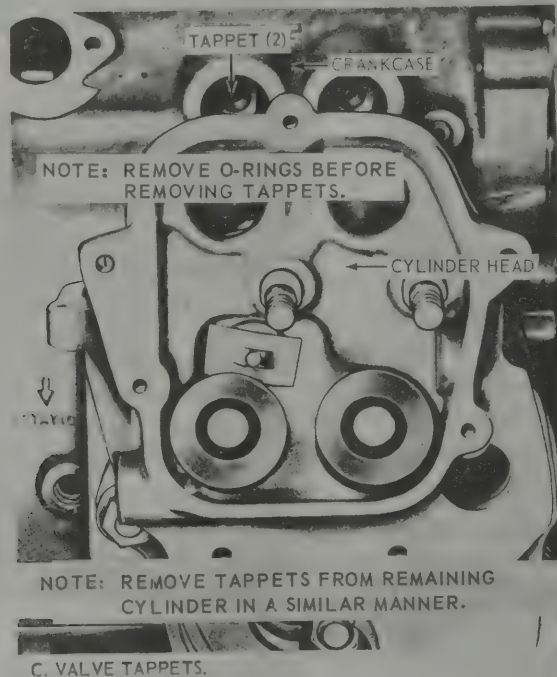


A. ROCKER ARM COVERS.

NOTE:
REMOVE ASSEMBLED ROCKER SHAFT AND
PUSHROD (2) BEFORE ROCKER ARM REMOVAL.
REMOVE ROCKER ARM, PUSHROD, AND
PUSHROD HOUSING FROM REMAINING
CYLINDERS IN A SIMILAR MANNER.



B. ROCKER ARMS, PUSHRODS, AND PUSHROD HOUSINGS.



C. VALVE TAPPETS.

ME 2805-258-14/4-3

Figure 4-3. Rocker arm cover, rocker arms, push rods, and tappets, removal and installation.

Section VII. CAMSHAFT, GEAR, DIAPHRAGM BAFFLE, AND BEARING

4-16. General

This section contains information on the maintenance of the camshaft, gear, and bearing which is the responsibility of direct support and general support maintenance personnel.

4-17. Camshaft, Gear, Diaphragm Baffle, and Bearing

a. Removal.

- (1) Remove fuel pump (para 3-26).
- (2) Remove tappets (para 4-15).
- (3) Remove oil pump gears (para 4-19).
- (4) Remove timing gear cover (para 4-13).
- (5) Refer to figure 4-4 and remove camshaft, gear, diaphragm baffle, and bearing.

b. Cleaning, Inspection, and Repair.

- (1) Clean all parts with an approved cleaning solvent and blow dry with compressed air.

- (2) Inspect camshaft for cracks, breaks, pitting and wear.

- (3) Inspect gear for chipped or broken teeth and wear.

- (4) Measure inside diameter of camshaft bearing. Refer to table 4-2 for correct diameter.

- (5) Measure diameter of front bearing journal on camshaft. Refer to table 4-2 for correct dimensions.

- (6) Replace a damaged or defective part.

c. Installation.

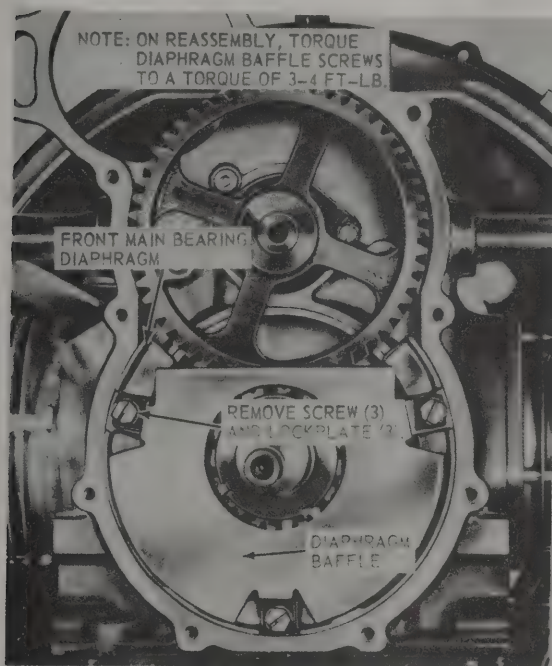
- (1) Refer to figure 4-4 and install camshaft, gear, diaphragm baffle, and bearing.

- (2) Install timing gear (para 4-13).

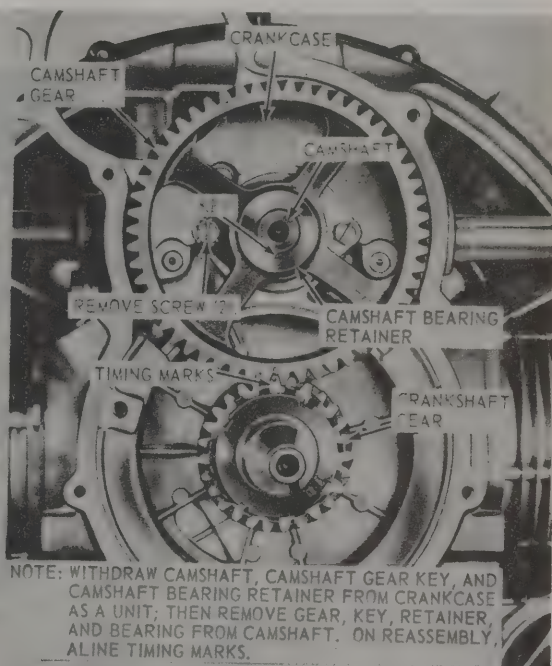
- (3) Install oil pump gears (para 4-19).

- (4) Install tappets (para 4-15).

- (5) Install fuel pump (para 3-26).



A. DIAPHRAGM BAFFLE.



B. CAMSHAFT, GEAR, AND BEARING.

MEC 2805-204-14/52

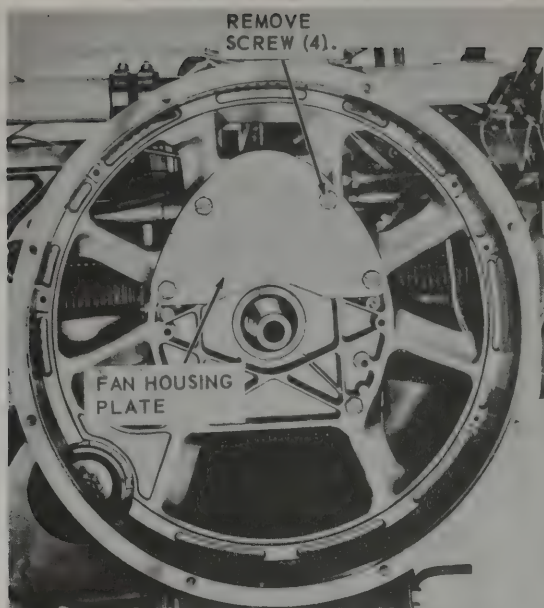
Figure 4-4. Camshaft, gear, diaphragm baffle, and bearing, removal and installation.

Section VIII. OIL PUMP COVER, OIL PUMP GEARS, THRUST PLATE, AND IDLER SHAFT

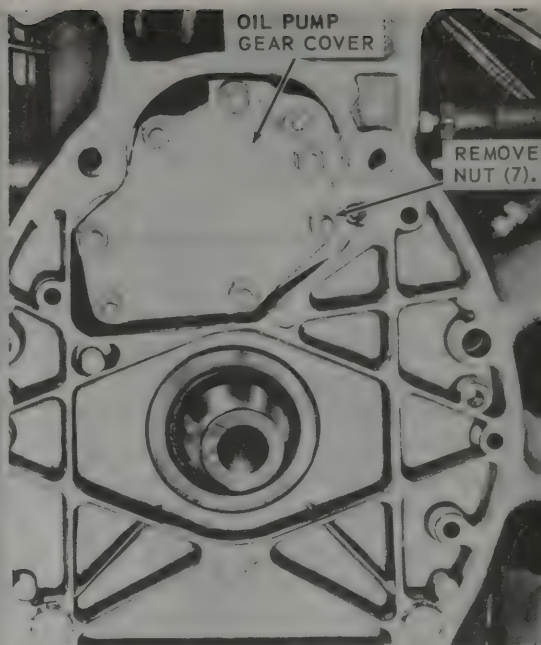
4-18. General

This section contains information on the maintenance of the oil pump gears and shafts which are

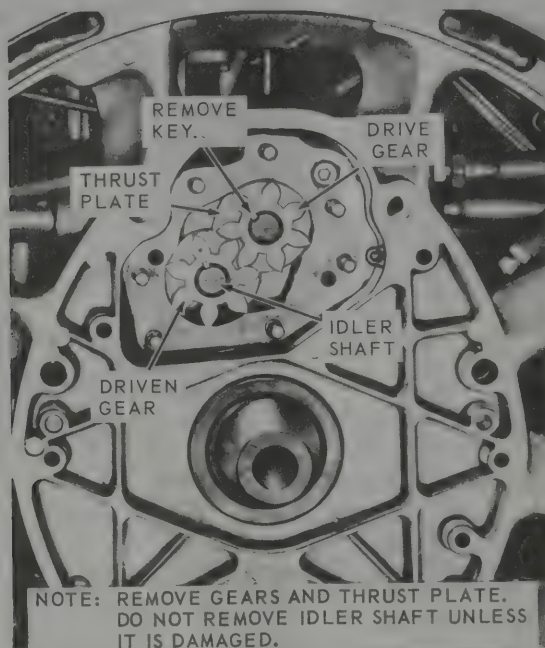
the responsibility of direct support and general support maintenance personnel.



A. FAN HOUSING PLATE.



B. OIL PUMP GEAR COVER.



C. OIL PUMP GEARS, THRUST PLATE, AND IDLER SHAFT.

ME 2805-258-14/4-5

Figure 4-5. Oil pump cover, oil pump gears, thrust plate, and idler shaft, removal and installation.

4-19. Oil Pump Cover, Oil Pump Gears, Thrust Plate, and Idler Shaft

a. Removal.

- (1) Remove flywheel (para 4-11).
- (2) Refer to figure 4-5 and remove oil pump cover, oil pump gears, thrust plate, and idler shaft.

b. Cleaning and Inspection.

- (1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect gears for chips, broken teeth, and excessive wear.

(3) Inspect thrust plate for scoring and excessive wear. Replace all defective gaskets.

(4) Replace all damaged or defective parts.

Note. Refer to table 4-1 for torque data.

c. Installation.

(1) Refer to figure 4-5 and install oil pump cover, oil pump gears, thrust plate, and idler shaft.

(2) Install flywheel (para 4-11).

CHAPTER 5

REPAIR INSTRUCTIONS

Section I. CYLINDER HEAD AND VALVE ASSEMBLY

5-1. General

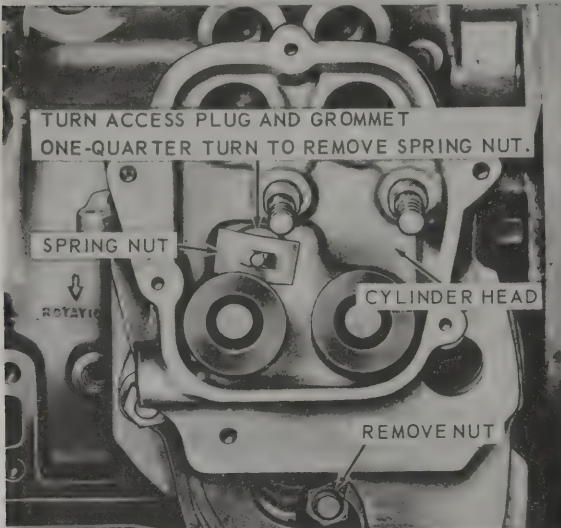
The military standard engines are of the valve-in-head type. The valves are actuated by camshaft-driven, hydraulic valve tappets, push rods, and rocker arms. The cylinder heads are precision-machined, alloy castings with integrally cast fins, arranged to provide efficient heat dissipation.

5-2. Cylinder Head and Valve Assembly

a. Removal.

- (1) Remove spark plugs (para 3-32).
- (2) Remove top, right and left shrouds (para 3-17), and cylinder air baffles (para 3-18).

NOTE: MAKE CERTAIN ON INSTALLATION THAT CYLINDER HEAD SEALING SURFACE AND MATING SURFACE ON CYLINDER ARE FREE FROM DIRT AND BURS.



NOTE: ON INSTALLATION, TORQUE CYLINDER HEAD NUTS TO 22-24 FT-LB.

ME 2805-258-14/5-1 ①

1 Model 2A042-2 and early model 4A042-3

Figure 5-1. Cylinder head and valve assembly, removal and installation.

- (3) Remove intake manifold elbows (para 3-28).

- (4) Remove exhaust manifolds and connecting pipe (para 3-21).

- (5) Remove rocker box hoses (para 3-40).

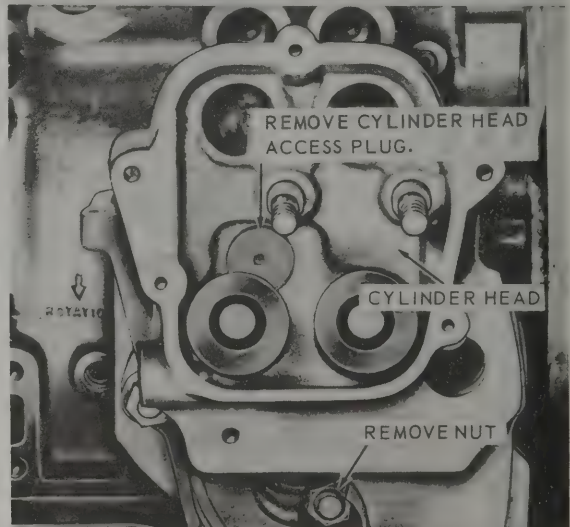
- (6) Remove rocker shafts, push rods, and push rod housings (para 4-15).

- (7) Refer to figure 5-1 and remove cylinder head and valve assembly.

b. Disassembly. Refer to figure 5-2 and disassemble the cylinder head and valve assembly.

Note. Valve Guides and seats can be replaced only by heating cylinder head to 475-500° F. and chilling guides and seats to -65° F.

NOTE: MAKE CERTAIN ON INSTALLATION THAT CYLINDER HEAD SEALING SURFACE AND MATING SURFACE ON CYLINDER ARE FREE FROM DIRT AND BURS.

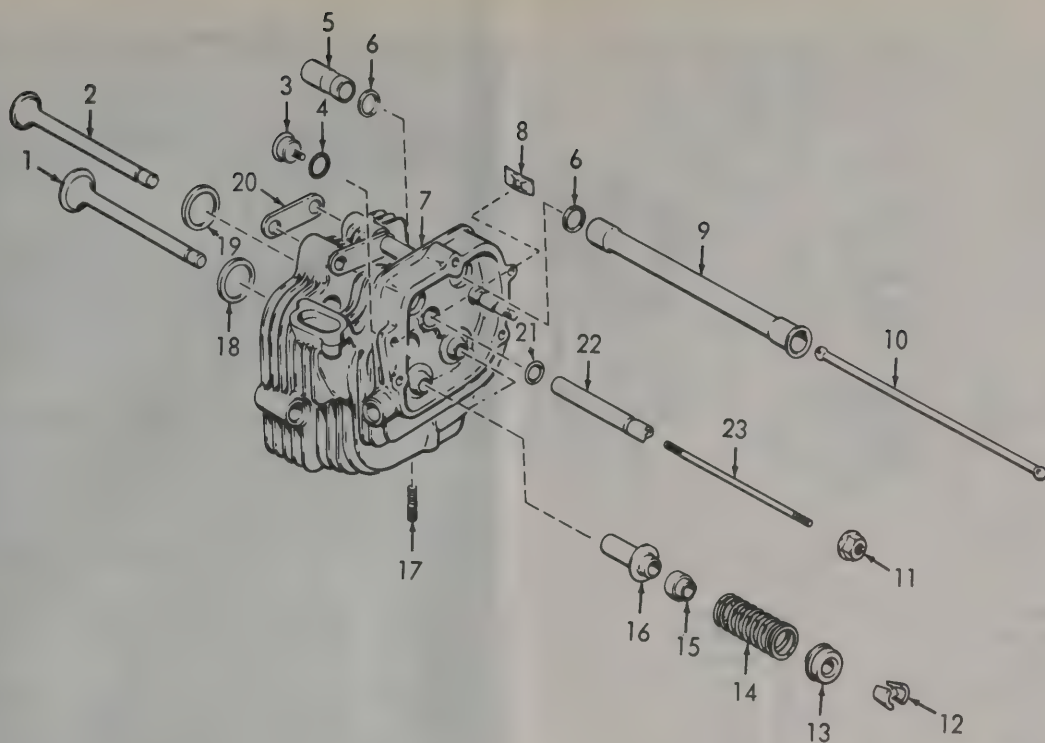


NOTE: ON INSTALLATION, TORQUE CYLINDER HEAD NUTS TO 22-24 FT-LB.

ME 2805-258-14/5-1 ②

2 Late Model 2A042-3

Figure 5-1—Continued.



MEC 2805-204-14/46

- | | | | |
|---------------------|--------------------|----------------------|-------------------------|
| 1 Intake valve | 7 Cylinder head | 13 Valve rotor | 19 Exhaust valve seat |
| 2 Exhaust valve | 8 Spring nut | 14 Valve spring | 20 Rocker shaft support |
| 3 Access plug | 9 Push rod housing | 15 Seal | 21 Preformed packing |
| 4 Preformed packing | 10 Push rod | 16 Valve guide | 22 Rocker shaft support |
| 5 Tappet | 11 Nut | 17 Stud | 23 Stud |
| 6 Preformed packing | 12 Rotor key | 18 Intake valve seat | |

1 Model 2A042-2

Figure 5-2. Cylinder head and valve assembly, disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly. Remove all carbon deposits.

(2) Inspect cylinder heads for cracks, breaks, evidence of leakage, and burned valve seats.

(3) Inspect valve springs for brakes, distortion, and crystallization or fatigue.

(4) Inspect valves for warpage, excessive wear, burning or burned or worn faces.

(5) Measure intake and exhaust valve stems. Refer to table 4-2 for correct diameter.

(6) Reface valve seats in cylinder head and intake and exhaust valves to an angle of 45°. After refacing valves and seats, lap individual valves in their seats and remove all lapping compound. Refer to table 4-2.

(7) Replace all valve stem seals.

(8) Replace all damaged or defective parts.

Note. Refer to table 4-1 for torque data.

d. Reassembly. Refer to figure 5-2 and reassemble cylinder head and valve assembly.

e. Installation.

(1) Refer to figure 5-1 and install cylinder head and valve assembly.

(2) Install rocker shafts, push rods, and push rod housings (para 4-15).

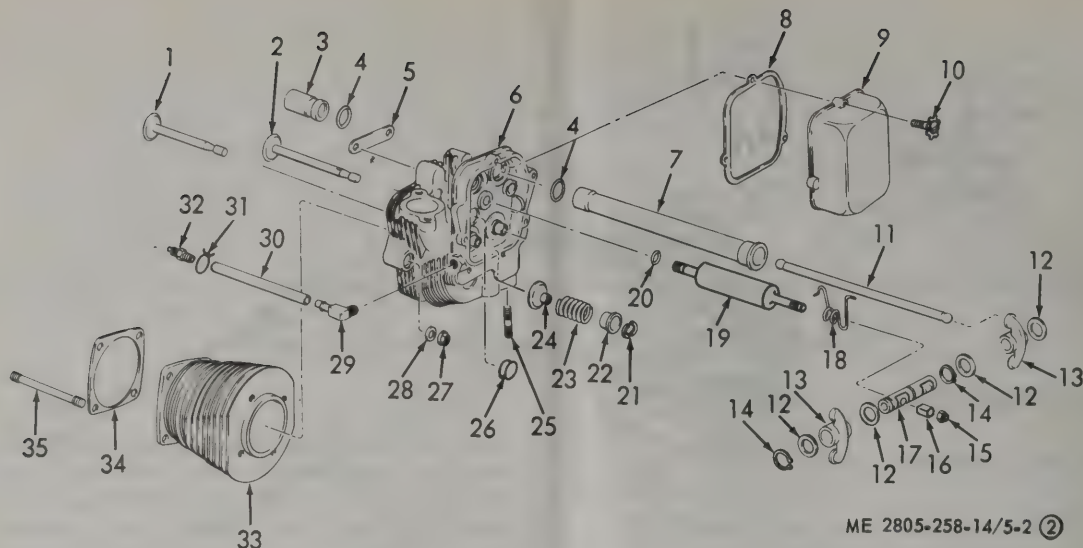
(3) Install rocker box hoses (para 3-40).

(4) Install exhaust manifolds and connecting pipe (para 3-21).

(5) Install intake manifolds elbows (para 3-28).

(6) Install top, right, and left shrouds, and cylinder baffles (para 3-17).

(7) Install spark plugs (para 3-32).



1 Intake valve	10 Screw	19 Support	28 Washer
2 Exhaust valve	11 Push rod	20 Preformed packing	29 Nipple
3 Tappet	12 Washer	21 Lock	30 Hose
4 Preformed packing	13 Arm	22 Rotor cap	31 Clamp
5 Plate	14 Ring	23 Spring	32 Nipple
6 Cylinder head	15 Nut	24 Seal	33 Cylinder
7 Housing	16 Cap	25 Stud	34 Gasket
8 Gasket	17 Shaft	26 Plug	35 Stud
9 Cover	18 Spring	27 Nut	

2 Model 2A042-3

Figure 5-2—Continued.

Section II. OIL PAN AND CHECK VALVE

5-3. General

This section contains information on the maintenance of the oil pan and check valve which is the responsibility of direct support and general support maintenance personnel.

5-4. Oil Pan and Check Valve

a. Removal.

(1) Remove oil pan cover and shroud (para 3-19).

(2) Refer to figure 5-3 and remove oil pan and check valve.

Note. Refer to applicable End Item Technical Manual for specific draining instructions.

b. *Disassembly.* Refer to figure 5-4 and disassemble check valve and oil pan.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect oil pan for cracks and breaks.

(3) Inspect check valve cover and body for cracks and corrosion.

(4) Inspect screen for corrosion and other damage.

(5) Inspect check valve and valve retainer for excessive wear.

(6) Inspect spring for pitting, cracks, and other damage.

(7) Inspect oil drain pressure tube for cracks, breaks, and other damage.

(8) Replace a damaged or defective part.

d. *Reassembly.* Refer to figure 5-4 and reassemble oil pan and check valve.

e. Installation.

(1) Refer to figure 5-3 and install oil pan and check valve.

(2) Install oil pan cover and shroud (para 3-19).

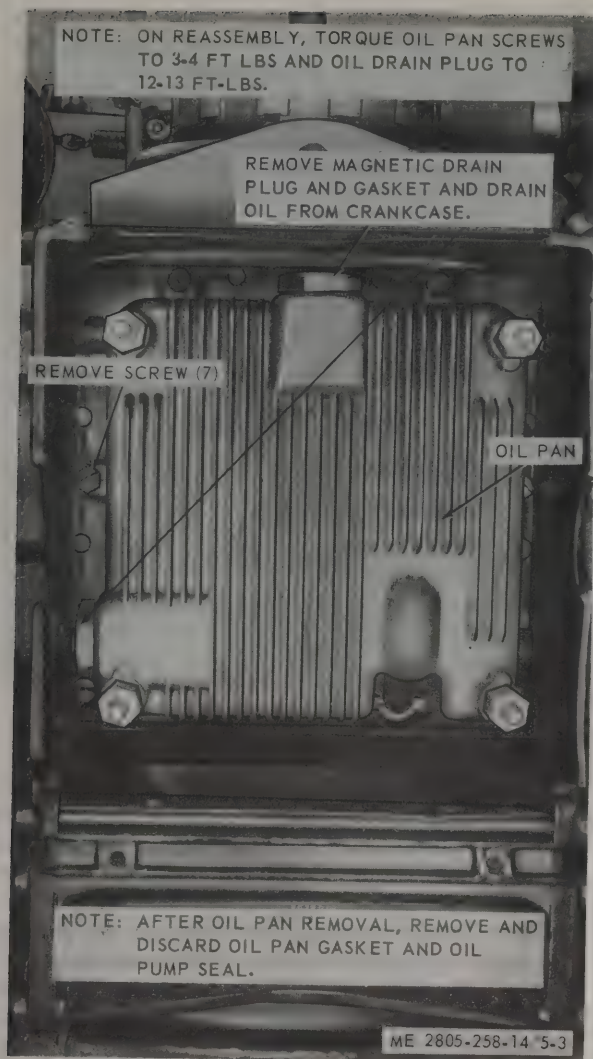


Figure 5-3. Oil pan and check valve, removal and installation.

NOTE: MODEL 2A042-3 SHOWN.
PROCEDURE SAME FOR
MODEL 2A042-2.

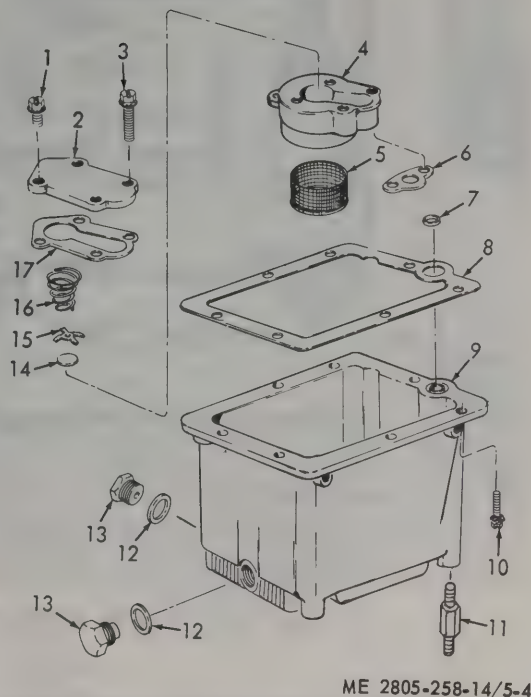


Figure 5-4. Oil pan and check valve, disassembly and reassembly.

Section III. CYLINDERS, PISTONS, AND CONNECTING RODS

5-5. General

The military standard engines are provided with cylinders or alloy case over close-grained, iron liners. The pistons are of the cam-ground, auto-thermic type, with floating-type piston pins. Each connecting rod is an H-section steel forging, with bronze piston pin bushings.

5-6. Cylinders, Pistons, and Connecting Rods

a. Removal.

- (1) Remove cylinder heads (para 5-2).
- (2) Remove oil pan (para 5-4).

(3) Refer to figure 5-5 and remove cylinders, pistons, and connecting rods.

b. *Disassembly.* Refer to figure 5-6 and disassemble cylinders, pistons, and connecting rods.

Caution. Mark cylinder heads, pistons connecting rods, rings, pins, valve springs, rocker arm shafts, cylinders etc., as they are disassembled to assure reassembly in correct location and direction of rotation.

c. *Cleaning, Inspection and Repair.*

(1) Clean all parts with an approved cleaning solvent and dry with compressed air.

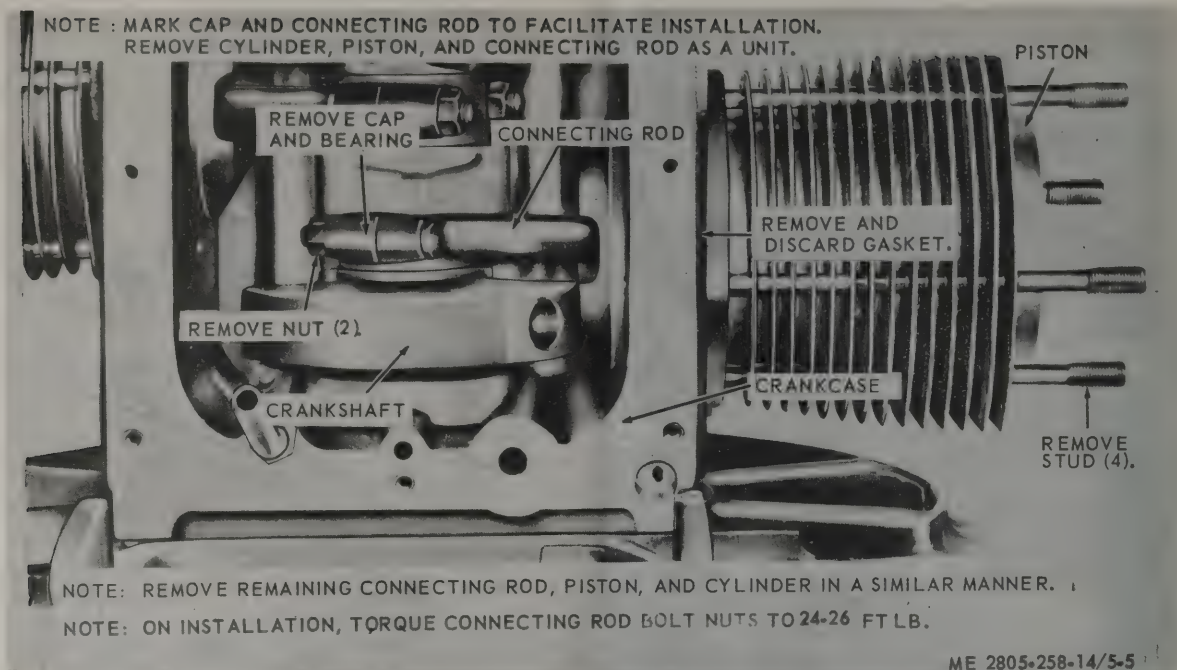


Figure 5-5. Cylinders, pistons, and connecting rods, removal and installation.

(2) Inspect each cylinder for cracks, breaks, and scored areas. Measure the inside diameter at the top, middle, and bottom. Take two measurements at each location with one measurement at 90° in respect to the other. Refer to Table 4-2 for correct measurements.

(3) Inspect each piston for cracks, breaks, and scored areas. Measure the top and bottom skirt diameter. Take measurements on sides of piston opposite piston pin hole. Refer to table 4-2 for correct diameter. Measure diameter of piston pin hole and piston pin. Refer to table 4-2 for correct dimensions.

Note. For overhaul purposes use "D" size piston. Any cylinder needing honing to restore concentricity should be honed to D-size.

(4) Inspect each connecting rod and cap and

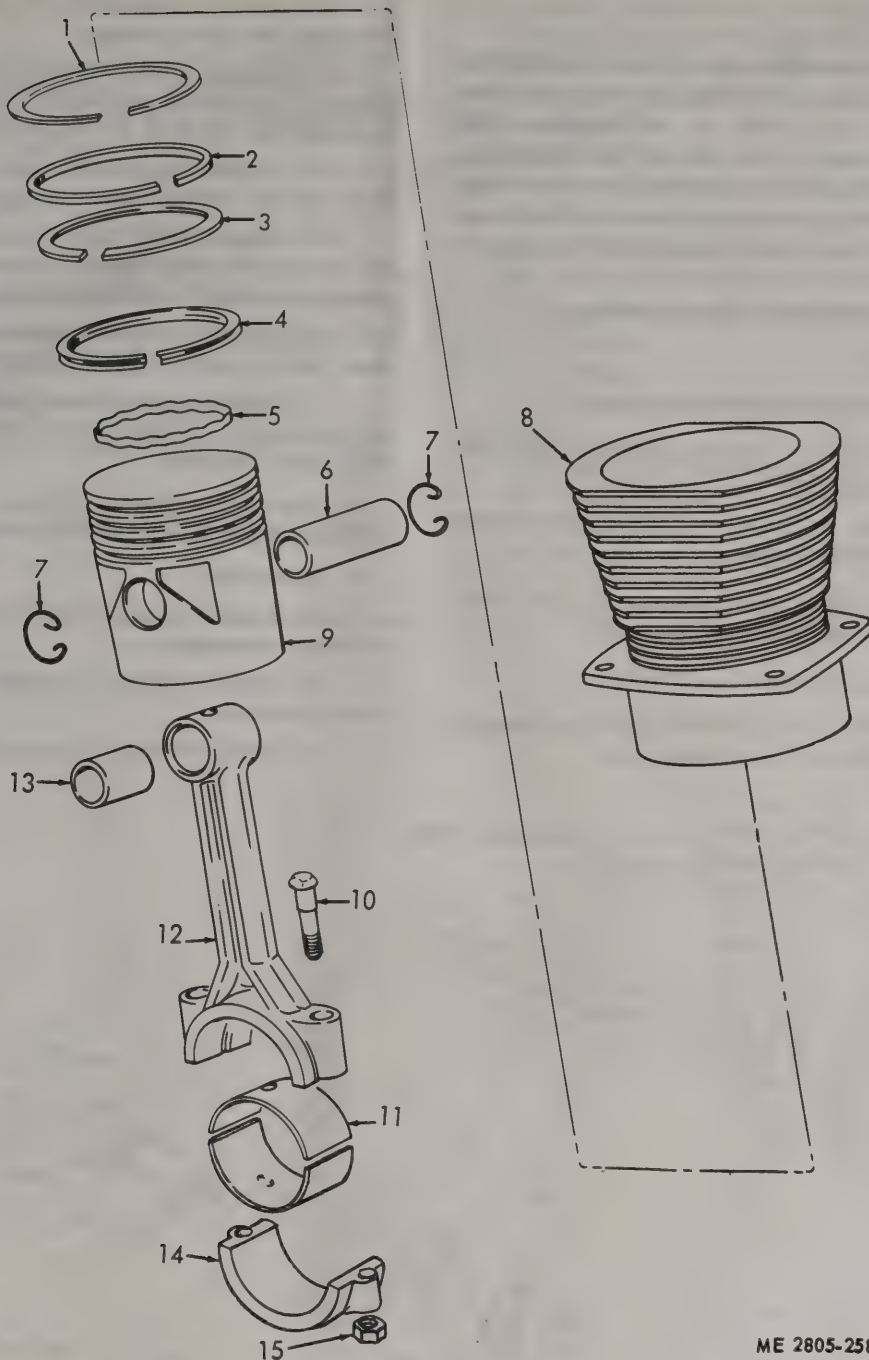
the connecting rod bolts for cracks, damaged threaded areas, and other damage. Measure the inside diameter of piston pin bushing. Refer to table 4-2 for correct diameter. If bushing is worn, press in a new bushing and ream to the correct diameter. Assemble the cap to the connecting rod. Torque the nuts to 24-26 foot-pounds. With cap assembled, measure connecting rod bearing bore diameter. Refer to table 4-2 for correct diameter.

(5) Replace a damaged or defective part.

d. Reassembly. Refer to figure 5-6 and reassemble cylinders, pistons, and connecting rods.

Note. Arrow on piston must point in direction of rotation of crankshaft.

e. Installation. Refer to figure 5-5 and install cylinders, pistons, and connecting rods.



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- | | | | |
|---------------------------------|-------------------|---------------------------|--------|
| 1 Ring spacer | 4 Oil piston ring | 9 Piston | 14 Cap |
| 2 Top compressed piston ring | 5 Expander ring | 10 Bolt | 15 Nut |
| 3 Intermediate compression ring | 6 Piston ring | 11 Connecting rod bearing | |
| | 7 Retainer ring | 12 Connecting rod | |
| | 8 Cylinder | 13 Bushing | |

Figure 5-6. Cylinders, pistons, and connecting rods, disassembly and reassembly.

Section IV. CRANKSHAFT AND MAIN BEARINGS

5-7. General

The crankshafts used in the military standard engines are similar in material, balance, and other specifications, but differ in configuration. The crankshaft thrust is absorbed by the front main bearing diaphragm. The crankshafts are rough-machined and the journals are case hardened, machine finished, and finally dynamically balanced.

5-8. Crankshaft and Main Bearing

a. Removal.

- (1) Remove camshaft (para 4-17).
- (2) Remove cylinders, pistons, and connecting rods (para 5-6).
- (3) Refer to figure 5-7 and remove crankshaft and main bearings.

b. *Disassembly.* Refer to figure 5-7 and disassemble crankshaft and main bearing.

c. Cleaning, Inspection and Repair.

- (1) Clean all parts with an approved cleaning solvent and dry with compressed air.

(2) Inspect crankshaft for cracks, scoring, warpage, and other damage.

(3) Measure main bearing journals. Refer to table 4-2 for correct measurements. If crankshaft is excessively worn or scored, replace crankshaft.

(4) Inspect crankshaft gear for signs of wear, pitting, cracks, breaks, and other damage.

(5) Inspect front main bearing diaphragm for cracks, and other damage. Inspect for signs of wear at outside of main bearing bore.

(6) Measure inside diameter of main bearings. Refer to table 4-2 for correct dimensions.

(7) Assemble front main bearing diaphragm on crankshaft and diaphragm. Refer to table 4-2 for proper clearance.

d. *Reassembly.* Refer to figure 5-7 and reassemble crankshaft and main bearings.

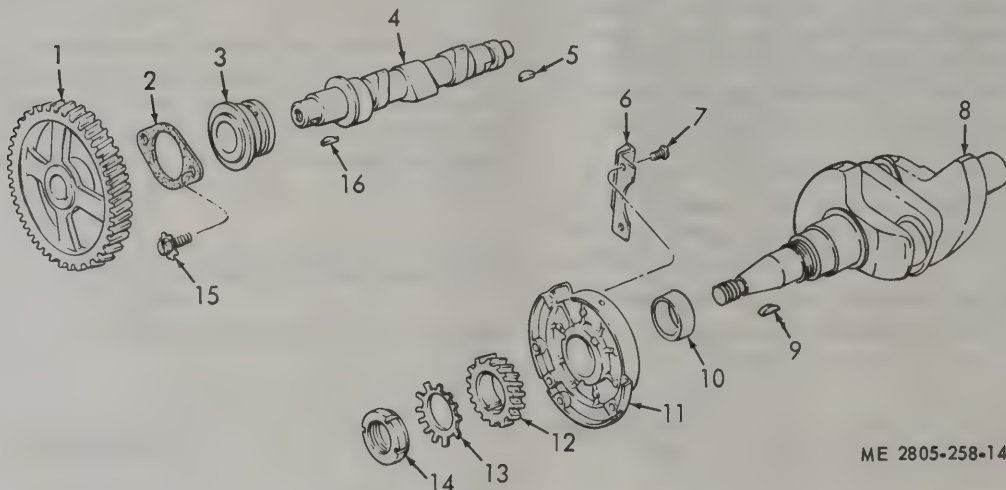
e. Installation.

(1) Refer to figure 5-7 and install crankshaft and main bearings.

(2) Install cylinders, pistons, and connecting rods (para 5-6).

(3) Install camshaft (para 4-17).

NOTE: MODEL 2A042-3 SHOWN. PROCEDURE FOR MODEL 2A042-2 IS SAME.



1 Gear	5 Key	9 Key	13 Washer
2 Retainer	6 Guard	10 Bushing	14 Nut
3 Bearing	7 Screw	11 Diaphragm	15 Screw
4 Crankshaft	8 Crankshaft	12 Gear	16 Key

Figure 5-7. Crankshaft and main bearings, removal, disassembly, reassembly, and installation.

Section V. CRANKCASE

5-9. General

The crankcase used in the military standard engines are of machined, cast, aluminum alloy. The oil pump gear counterbore and oil passages are machined in the castings.

5-10. Crankcase

a. Removal.

- (1) Remove crankcase breather (para 3-45).
- (2) Remove oil pressure regulator valve (para 3-43).
- (3) Remove flywheel housing (para 4-11).
- (4) Remove crankshaft and main bearings (para 5-8).

b. Disassembly. Refer to figure 5-8 and disassemble crankcase.

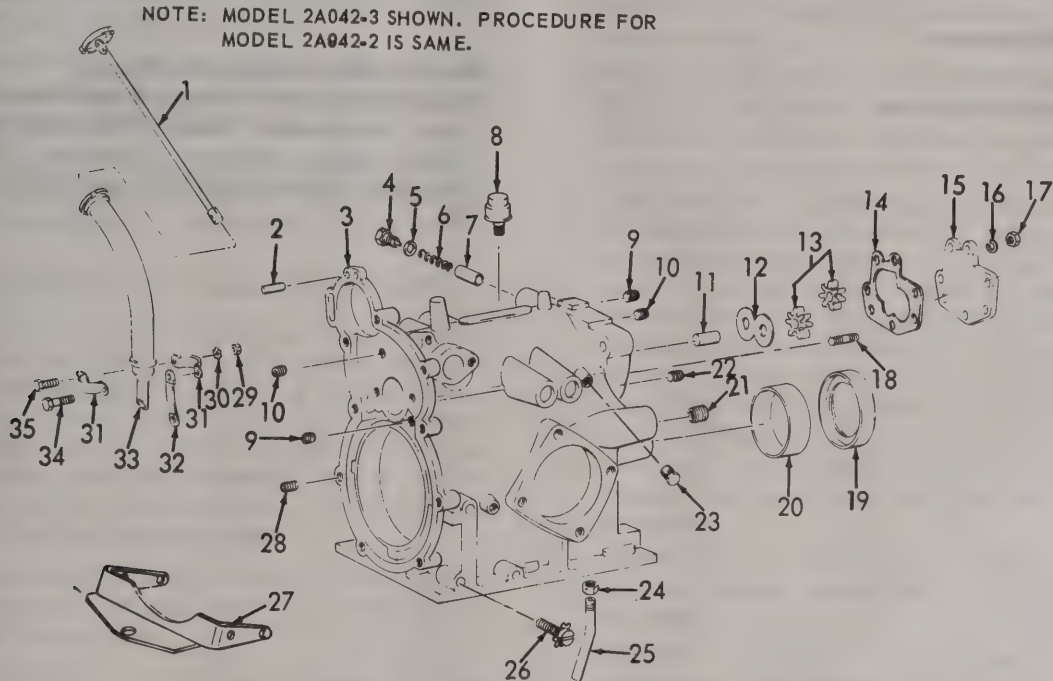
c. Cleaning, Inspection, and Repair.

- (1) Clean all parts with an approved cleaning solvent and blow dry with compressed air.
- (2) Inspect crankcase for cracks, breaks, and other damage.
- (3) Inspect interior of oil pump gear counterbore for excessive wear and scored areas.
- (4) Measure oil pump gear clearances. Refer to table 4-2 for clearance.
- (5) Replace all damaged or defective parts.

d. Reassembly. Refer to figure 5-8 and reassemble crankcase.

e. Installation.

- (1) Install crankshaft and main bearings (para 5-8).
- (2) Install flywheel housing (para 4-11).
- (3) Install oil pressure regulator valve (para 3-43).
- (4) Install crankcase breather (para 3-45).



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1 Oil gage	10 Plug	19 Seal	28 Insert
2 Pin	11 Shaft	20 Bushing	29 Nut
3 Crankcase	12 Spacer	21 Insert	30 Washer
4 Plug	13 Gear	22 Plug	31 Clamp
5 Gasket	14 Gasket	23 Plug	32 Bracket
6 Spring	15 Cover	24 Nut	33 Tube
7 Valve	16 Washer	25 Tube	34 Screw
8 Breather	17 Nut	26 Screw	35 Screw
9 Plug	18 Stud	27 Mount	

Figure 5-8. Crankcase, disassembly and reassembly.

APPENDIX A

REFERENCES

1. Lubrication

LO 5-2805-258-12

C9100IL

Engine, Gasoline, Military Standard (Models 2A042-2 and 2A042-3) 10 Hp.
Fuels, Lubricants, Oils, and Waxes.

2. Painting

TM 9-213

Painting Instructions for Field Use.

3. Radio Suppression

TM 11-483

Radio Interference Suppression.

4. Maintenance

TM 5-764

TM 5-2805-258-24P

Electric Motor and Generator Repair.
Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists: Engine, Gasoline, Military Standard (Models 2A042-2 and 2A042-3) 10 Hp.

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

B-2. Explanation of Columns in Section II

a. *Group Number, Column 1.* The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1, Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. *Functional Group, Column 2.* This column contains a brief description of the components of each functional group.

c. *Maintenance Functions, Column 3.* This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions.

The symbol designations for the various maintenance categories are as follows:

- C—Operator or crew
- O—Organizational maintenance
- F—Direct support maintenance
- H—General support maintenance
- D—Depot maintenance

The maintenance functions are defined as follows:

- A—INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.
- B—TEST. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.
- C—SERVICE. To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.
- D—ADJUST. To rectify to the extent necessary to bring into proper operating range.
- E—ALIGN. To adjust specified variable elements of an item to bring to optimum performance.
- F—CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.
- G—INSTALL. To set up for use in an operational environment such as an emplacement, site, or vehicle.
- H—REPLACE. To replace unserviceable items with serviceable assemblies, subassemblies, or parts.
- I—REPAIR. To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.
- J—OVERHAUL. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.
- K—REBUILD. To restore an item to a standard as nearly as possible to original or new con-

dition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent re-assembly of the item.

d. Tools and Equipment, Column 4. This column is provided for referencing by code the special tools and test equipment, (sec. III) required to perform the maintenance functions (sec. II).

e. Remarks, Column 5. This column is provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions.

B-3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T&TE requirements column on the MAC. The letter represents the spe-

cific maintenance function the item is to be used with. The letter is representative of column A through K on the MAC.

b. Maintenance Category. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock Number of tools and test equipment.

B-4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column 5 and the second letter references a maintenance function, column 3, A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
01	ENGINE													
0100	Engine Assembly:-----	C	O	C					F	H	H			A
0101	Crankcase cylinder head:-----								F	F				B
	head assembly, cylinder-----								H	H				C
0102	Crankshaft:-----													
	Crankshaft assembly-----								H	H				
0103	Flywheel Assembly-----								F	H			1, 2, 3,--	D
0105	Valves Camshaft and Timing-----													
	System:-----													
	Valves-----								F	F				E
	Rocker and shaft assembly-----								F	F				F
0106	Engine Lubrication System-----													
	Filter, Oil-----			C					O					G
	Breather Assembly, Crank- case:-----			C					O					H
	Reed, air breather-----			O					O					
03	FUEL SYSTEM													
0301	Carburetors-----			O	O				O					I
0304	Air Cleaner-----													
	Air cleaner assembly-----			C					O					
0308	Engine Speed Governor and Controls:-----													
	Control assembly, governor-----		O		O				O	O				
	Governor assembly-----				O				O					J
0309	Fuel Filters:-----													
	Filter assembly, fuel-----	C		C					O					K

(1) Group No.	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
0312	Accelerator, Throttle or Choke Controls:													
	Choke Assembly, automatic				O				O					
05	COOLING SYSTEM													
0502	Cowling, Air Ducts, Shrouds:													
	Baffle, air control	C			C				O					
06	ELECTRICAL SYSTEM													
0601	Stator Assy, Alternator		O						O	F				
0602	Generator, Regulator													
	Regulator, Rectifier		O						O					
0603	Starting Motor													
	Starter Engine		O						O	F	H			
0605	Ignition Components													
	Magneto Assembly				O				O	O	H			
	Spark Plugs			O	O				O					L
0610	Engine Safety Controls													M
	Transmitter, Low Oil Pressure		O						O					
47	GAGES (nonelectrical):													
	Weighing and Measuring Devices													
4701	Instruments (speed and distance):													
	Adapter assembly tachometer								O					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
1—I	H	Driver, Oil Seal	(97403)
			13214E9630
2—I	H	Driver, Oil Seal	(97403)
			13214E9631
3—I	H	Remover, Oil Seal	(97403)
			13214E9632

Section IV. REMARKS

Reference code	Remarks
A—B	Test includes engine operation and compression.
B—I	Repair of cylinder head includes refacing of valve seats.
C—I	Repair of cylinder includes honing operation.
D—I	Replace ring gear.
E—I	Repair of valves includes refacing.
F—I	Repair of rocker arm pads includes grinding.
G—C	Replace element.
H—C	Clean breather and tube.
I—C	Clean carburetor bowl, replace gasket.
I—D	Adjust carburetor externally.
J—D	Adjust governor control rod.
K—H	Replace fuel filter bowl and gasket.
L—D	Adjust contact and breaker points.
M—C	Clean, adjust and replace spark plugs.

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